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CLINICAL LECTURE.

MYOSITIS.

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Gentlemen: Primary inflammations of the muscles are very rare. Ample proof for this assertion is evident in the fact that every typical case yet reported has been found in the largest clinics or hospitals, where the material offered is most extensive; besides this, the cases reported have been but very few in number. The small number of cases reported might lead one to believe that this line of affections possessed but little practical importance; if we look closer, however, and examine the histories of individual cases we will find that in every case reported there were considered diagnostic difficulties. Apart from the surgical interest in these cases, there is another point interesting to pathologists, in reference to the pathogenesis and pathology of the disease, and this is that in the reported cases of myositis in the majority of instances it has been impossible to obtain any material for microscopical examination, and in those cases in which the possibility has been offered and the specimens obtained they have been subsequently lost.

The study of acute myositis is much more simple, since the reported cases—especially those collected by Von Scriba* and Walther†—clearly show that we are dealing with a localized infectious process. Although the material we have had at our disposal is yet very meagre, still it is most probable that in the near future our knowledge of the pathology and etiology of this affection will be considerably broadened.

A most peculiar and interesting case occurred in the practice of Dr. Reuter, and as I had an intimate knowledge of it—being called in consultation on several occasions—I will recite its history. In doing so I will quote from the notes of Dr. Reuter, which he has very kindly placed at my disposal.

The patient was a woman, 28 years old, who had been married for about three months. One day while walking in the street she experienced a sudden, sharp pain in the calf of the left leg. The parts became gradually more and more swollen, and when a month later the patient presented herself for examination the greater part of the gastrocnemius muscle was found to be invaded by a dense, hard infiltration. The swelling was not painful, and the patient was not confined either to her room or bed. There was no fever. Hot fomentations were applied, and subsequently at one point there was a slight softening. This point was opened, but nothing else than serum was evacuated. Soon after the opening was made, however, a profuse fetid discharge began—occasioned, undoubtedly, by the entrance of the atmospheric air. The wound became enlarged, and during the course of the following weeks, one could pull large pieces of necrosed muscle of a yellowish-gray color out of the wound. At the same time three or four abscesses opened spontaneously at different parts of the muscles, from which also large pieces of necrosed muscle were removed.

In the meanwhile the patient went about her daily duties as usual, feeling entirely well, and only coming to the hospital at intervals when the opening of a new abscess, or rather the pressure prior to its opening, gave her feelings of distress and some fever.

Six months after the first intimation of the disease, the necrotic process ceased entirely, and a month later the healing of the parts was complete. The patient has experienced no subsequent difficulties, and the limb which was affected is no weaker than the other, although its circumference at the calf is fully 2 c. m. (¾ inch) less. There is no infiltration remaining in the muscle.

The treatment consisted primarily in the useless exhibition of iodide of potash for

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* *Deutsche Zeitschrift für Chirurgie*, xxiii, p. 497.

† *Ibid.*, xxv, p. 260.

three weeks. Subsequently, hot applications and poultices over the fluctuating parts until they opened, after which the wounds were dressed with creolin and rotterin.

The healing seemed to be hastened most decidedly by local bathing of the parts with sea-salt and water, and this treatment also seemed to facilitate the discharge of the gangrenous portions of muscle. The question, however, very naturally arises as to whether or not a similar bathing of the parts with plain water would not have accomplished equally good results.

The pieces of muscle taken from this case have been hardened in alcohol and subjected to a most careful examination. But I have only been able to find evidences of a muscular necrosis, with no infiltration or pus formation. In many of the fragments the muscular fibres have entirely disappeared, in others they may still be recognized by their contour, but their normal structure is entirely absent. The inner portion of the muscular fibres was entirely absent, and the fibres looked like hollow tubes, collapsed, tangled, and nicked. No bacteriological experiments were made at the time.

No other similar case to the above has as yet been published. The etiology would seem to point beyond all doubt to an infectious process, but to define this process is no easy task.

More difficult even than in the case of acute myositis, is the etiological definition of the chronic forms. This for the one reason that we are not always able to undertake surgical measures, and therefore are unable to obtain a view of the process as is the case in the acute form.

It seems—and I use the term "seems" advisedly—that there are two forms of chronic myositis: the parenchymatous and the interstitial. Pathological anatomists have left us entirely in the lurch regarding any data concerning chronic iodiopathic inflammations of the muscles, and all direct knowledge has been gleaned by traumatic processes.

When I said that there were two forms of chronic myositis, I should have added that I can furnish no anatomical proof for the existence of the parenchymatous form, since the only specimen I had in my possession has unfortunately been lost. Still, from the course of the case and the evidences gleaned from the specimen in question, I feel justified in having advanced the diagnosis of chronic, or more correctly subacute, parenchymatous myositis.

The patient was a poorly nourished young woman, who subsequently died of pulmonary tuberculosis, and whom I had been already treating for several months for abdominal troubles. The disease began by "tearing" pains in the right side, unaccompanied by any fever. Gradually a hard swelling appeared which occupied the entire iliac fossa. This swelling was painful upon pressure, and at certain points seemed to give evidence of a tense fluctuation. The accompanying stubborn constipation of the patient, and the region of the swelling, seemed to point to a probable disease of the cæcum and surrounding parts. So, I concluded to make an exploratory incision, and although I explored down to the sacrum, found no trace of pus, but only œdematous fluid. The muscles were remarkably hard, very pale, and waxy; the interstitiæ hardly recognizable, and apparently filled up by the swollen muscles. This condition rendered the exploration most difficult. Although the object of the operation was not accomplished, the disease subsequently disappeared within a few months. Probably this result was due to the release of pressure gained by the division of the fascia.

The finding in this case points to a process in the muscular fibres themselves. If the theory of an interstitial change were advanced in this case, then the narrowing of the spaces between the muscles could not be explained, for in such an event the spaces would be enlarged and the muscles easily divided. Cases, in which the muscles were similarly acutely and extensively diseased have been reported by Hepp. One of the cases died, and in the microscopical examination of the muscles, subsequently made by Recklinghausen, a parenchymatous inflammation and degeneration of the muscles was demonstrated.

Concerning the second form of chronic interstitial myositis, called "rheumatic," by Froriep, and *myositis fibrosa* by other authors, I am pleased to be able to show you, gentlemen, a most interesting case.

The patient is a woman, fifty-three years old, who came to this hospital* suffering from a most painful swelling of the leg from the knee down. Ten years ago she began to notice a gradually increasing weakness of the left lower extremity. The ankle-joint became swollen, and subsequently this swelling extended to the calf of the leg and nearly to the knee. The patient had complained of especially severe pains at night. These pains assumed the form of a severe burning sen-

*Augusta Hospital, Berlin, Germany.

tion, the parts affected even feeling hot to the touch. Rest to the limb and cold applications afforded her considerable relief. The patient also says that the swelling and pain have both been greater or less at times. Until two years ago the patient, in spite of her pain, was able to walk without assistance, since then she has been bed-ridden for one year, and during this time the swelling of the leg materially increased in hardness. The patient claims previously always to have enjoyed the best of health. There are no evidences of syphilis and no specific history.

At present you see that the entire left leg from the knee to the ankle-joint is considerably larger than the right, and as hard as a board. It is impossible to distinguish muscle from bone, and it would therefore seem that the limb is surrounded by dense tumor originating from the bone. The skin is only slightly movable, infiltrated, and the veins enlarged. No part of the swelling seems especially painful to the touch, although the patient complains of most intense spontaneous pains. No soft or even points of a doughy consistency can be found; the position of the foot is normal. The temperature of the diseased limb is not different from that of the other.

My diagnosis wavered between a chronic inflammatory process and sarcoma. In order to confirm either diagnosis, I have not long since made several incisions—the patient being anæsthetized—and am positive of the correctness of my first surmise. All the muscles of the calf of the leg were transformed into a dense tissue, which crackled under the knife. The parts most extensively affected—the peronei muscles—were almost pure white, with a few scarcely visible, pale-red spots or stripe; while the parts less affected—especially the gastrocnemius muscle—were covered more regularly with these red spots, while in the white substance of these muscles was a yellowish red, and plainly muscular substance visible at various points. Under the circumstances I concluded to refrain from any further surgical interference, and determined to try the effect of hot baths, etc., after the operative wound had healed.

The microscopical examination of portions of the peroneus muscle, which had been excised, showed these to consist almost entirely in tendinous connective tissue, in which isolated, atrophied muscular fibres could be distinguished. In the pieces of muscle excised from the gastrocnemius, bundles of muscular fibres were found, separated by broad divisions of loose connective tissue, which latter in many places is even found between the simple fibres. The fibres are considerably narrowed, the lateral stripe having disappeared, but a longitudinal stripe being very plain. The nuclei seem to be increased in number, although this apparent increase may possibly be due to the fact that the nuclei are brought closer together, giving an appearance of an increase of number.

Now, the woman's condition has not materially improved, and, indeed, an ultimate recovery from the local process is very questionable. The possibility of an ultimate recovery would be slim indeed were it to rest upon the necessity of the restoration to a normal condition of these muscles which have been strangulated by dense connective tissue, or in some instances even obliterated. Cicatricial connective tissue cannot well be regenerated into healthy muscle.

The local pains which the patient complains of so constantly, apart from the severe functional disturbances, no doubt have their origin in a strangulation or constriction of the nerves within the dense cicatrized or connective tissue.

Regarding the pathology of chronic myositis, in all the cases that have come to my notice the diagnosis has primarily wavered between myositis and sarcoma, and has only been confirmed after an exploratory incision had been made. Gies recently reported a case in which he had confirmed a diagnosis of chronic myositis at the end of the femur, by means of an exploratory incision.

It is furthermore an open question as to whether or not in the severer and more extensive forms of chronic myositis the same treatment as in severe cases of sarcoma would also be advisable—viz, amputation of the limb. The gain the patient enjoys by the retention of such a limb—as in the case before you—is entirely illusionary, especially when the constant pain and absolute uselessness of the limb is taken into consideration. And, indeed, the unnecessary postponement of such an operation might lead to a spreading of the disease.

In the case reported by Gies, and also in the one reported by Kreiss, recovery was obtained by the use of electricity and massage; and in light cases such a treatment is undoubtedly not without promise.

Regarding the prognosis, I have touched upon it sufficiently during the course of this lecture.

The etiology remains obscure, unless we would infer that rheumatism—that patient but victimized ailment which answers for so

many indefinable maladies—is its original cause. This theory is, however, of little weight, even when our limited pathological researches are taken into consideration.

PROLAPSUS UTERI, COMPLICATED BY SUPRA-VAGINAL ELONGATION OF THE CERVIX — ABDOMINAL SECTION FOR PUERPERAL SEPTICÆMIA.

By E. E. MONTGOMERY, M. D.

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Gentlemen:—The patient I propose to bring before you now is a woman thirty-eight years of age, whose occupation is housework; she was married at 16 years, and has given birth to four living and two dead children. Menses are regular, lasting three days and are accompanied with pain in the back and head, and with occasional inability to urinate. She suffers from profuse leucorrhœa, and this distress has been increased for the last two years. Bowels regular, appetite poor.

As we separate the limbs of the patient, you see there is a protrusion from the vulva; this protrusion is hard and dense. the finger can be passed in front of it, showing that it is not a cystocele, and in the same way posterior, which indicates that it cannot be a rectocele; we consequently must have then, a descent of the central portion of the vaginal canal or of the uterus. Prolapsus of the uterus varies in degrees: thus, where it has descended and is situated just within the vaginal orifice, it is known as first degree; where a portion protrudes through the vagina, it is prolapsus in the second degree, and where the entire uterus is protruded, it is known as the third degree or procidentia. In this patient the condition is one of incomplete prolapsus, as when a portion of the surface projects from the cavity and the finger can be passed anteriorly and posteriorly nearly the normal length of the vagina. In this condition consequently, with the fundus of the uterus situated high up, with the vaginal walls retaining their normal length and relations, we have to deal with a condition complicating prolapsus, and that is one in which the cervix has undergone elongation in its supra-vaginal portion, and consequently is known as supra-vaginal elongation, or hypertrophy of the cervix. This condition is one which is likely to take place where the perineal or pelvic floor has undergone disaster during parturition, and the uterus or vaginal walls are no longer supported.

The heavy anterior or posterior vaginal wall dragging upon the cervix will lead either to the displacement of the entire uterus, or in those conditions in which the fundus of the uterus is fixed by a healthy condition of its ligaments, or by inflammatory adhesions, the cervix itself is dragged upon, until, like any elastic tissue, it becomes elongated, in some cases forming a mere thread-like structure connecting the prolapsed portion with the fundus of the uterus above.

This patient, however, differs from the cases thus described, in the fact that there is no turning out of either the anterior or posterior vaginal walls; we have consequently an elongation of the cervix which has originated from the weight of the lower end of the cervix itself. If we come to investigate this, we find that the organ is quite dense and firm, enlarged, that it has undergone a bilateral laceration, and the ends of the cervix or lips are widely separated, giving it the appearance of the condition so aptly described by Goodell as a celery-top cervix. It is this organ, then, which has given rise to the elongation of the supra-vaginal, or intra-vaginal cervix. As I place my finger anteriorly and posteriorly to this, I find that the lower end of the cervix is quite large, spread out, while above it is very much contracted and cord like. The condition here has undoubtedly originated in the bilateral laceration of the cervix, which has taken place in some one of her labors, possibly an early one. The efforts on the part of Nature to restore the condition has led to induration, thickening and increased weight, and dragging upon the parts above, until this elongation has resulted.

In such a condition the patient necessarily complains of the sensation of dragging, weight and want of support, and in the upright position as if everything was about to fall out. There is also a great burning in the region of the cervix, and in the bladder. This burning, particularly of the cervix, is necessarily induced by the exposure of the delicate mucous membrane, and by friction of the sur-

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*Clinical lecture delivered at the Medico-Chirurgical Hospital, Feb. 9, 1892.

face against the body of the patient, and against her clothing, with frequent bathing in the urine as it is voided. This, in some cases, leads to extensive ulceration. Bladder symptoms are not unfrequent in such states.

The traction upon the anterior vaginal wall leads to displacement of the bladder, which is closely associated with it, so that a portion of it is still below the internal orifice of the urethra, and is only emptied when the organ is pushed up. The retention of a portion of the urine in this way soon leads, by the increased amount of mucus secreted, to the disposition to inflammation of the mucous membrane, to burning and distress, to frequent micturition, and from this condition not unfrequently result calculi, sometimes of considerable size. It is a serious question in a patient suffering from a condition of this kind, as to what shall be done for her relief. How can the uterus be replaced and retained in its normal position? There are a number of mechanical appliances for the retention of a replaced uterus. We can readily understand that internal pessaries in such a patient would be of little value, for the reason that the cervix is so greatly elongated that it is likely to fall through the pessary, and if we should use the disc pessary, or one with a view of blocking up to a certain degree the outlet, and holding the cervix above it, the pressure upon the cicatricial tissue, and delicate cervical mucous membrane would result in abrasion, ulceration, and irritation so great as to render it unbearable, or would develop very rapidly a malignant disease.

Pessaries for external support are equally objectionable, so that we would dismiss the idea of attempting to maintain it by any such means. We are consequently left with the necessity of considering a surgical operation with a view to the correction of the abnormal condition. It is particularly important in this patient that the displacement should be relieved on account of the extensive laceration that exists in the cervix and the tendency there would necessarily be from its continued irritation to the development of malignant disease. The possibility of malignant disease arising in such conditions is no longer questioned; the fact that the disease in the uterus is often in the great majority of cases in the cervix, which is necessarily the site of any lesions following parturition, very strongly confirms the theories suggested as to the influence of this lesion in the development of malignant disease.

In this patient the condition is still more favorable to such degeneration, on account of the prolapsed state of the organ, its necessarily constant friction against the clothing of the patient or against her body, thus greatly increasing the irritation. What shall then be our course of treatment in such a patient? We may, very readily of course, overcome the dangers from the effect of the structure by repairing the cervix, freshening the edges and bringing the surface together by means of sutures. This would overcome the laceration of the surface, but often after it healed, we would have a very greatly elongated organ which would be prolapsed and give rise to a great deal of discomfort and inconvenience. So for this reason, in order to remove the irritation from its presence, I would suggest that an amputation of the cervix be made, pushing off the bladder from the anterior lip and dissecting up on the posterior lip nearly to the peritoneum, making flaps from the uterine mucous membrane, so that the formation of a non-contractile external os would be effected. This operation will remove the wedge-shaped surface from the vagina, which would greatly imperil any operation that might be done of a plastic character upon the vaginal walls, a condition which would sooner or later again develop the displacement of the uterus.

The first step, then, in the operation would be amputation of the cervix, and that high up. We will then retract the anterior wall of the vagina, which may be done by a variety of operative measures; thus, denuding a wedge-shaped surface, or a circular or oblong section, and affording opportunity to retract the vagina in different directions. In some cases the operation known as the circular denudation with purse string will be very effective. The retracted anterior wall must be supported by bringing the perineum up against it, which may be done by the Emmet operation, or in a case such as this, probably preferably by the operation recommended by Martin, which consists in taking out a section on either side of the posterior wall, bringing the edges of each denuded surface together by sutures, and then denuding and suturing the vulvar outlet. The difficulty in all operative procedures upon the vagina in these cases is the want of support of the upper third of the vagina. The result is, the uterus sags down upon the newly united surfaces, and acts as a wedge which favors still further the dilatation, and subsequently, after a length of time, makes its exit externally, leaving the patient in a more aggravated condition than before. This is particularly true of the denudation of the anterior wall of the vagina. If it does not unite readily, we have a push-

ing through the denudation of the bladder wall, covered with simply a thin layer of cicatricial tissue, which is so sensitive to pressure that it will not bear a pessary, and the condition of the patient is an exceedingly difficult one to subsequently relieve by any operative procedure.

If in this patient, we had, instead of the elongation of the cervix such as I show you, an entire prolapsus of the uterus, forming what is known as procidentia, with the uterus retroverted, in my judgment, the better plan of procedure would be to remove the entire organ, performing extirpation of the uterus when the vaginal walls might be closed, retracted laterally, and the tendency to prolapsus be very greatly lessened on account of the decreased weight at the upper portion of the canal. The operation would be an exceedingly easy one, as the vessels could be exposed and ligated without any danger of serious hæmorrhage. The plan of procedure, however, is not an applicable one to this case, for the reason that the fundus of the uterus is situated still high up. In a case of complete prolapse or procidentia of the uterus, in the Philadelphia Hospital some years ago, I performed what is known as the Le Fort operation, which consists in denuding a section upon the anterior wall about four-fifths of an inch in width the entire length of the wall, a similar one upon the posterior wall, and bringing these surfaces together by suturing the edges of the mucous membrane on either side in such a way that the raw surfaces lie in apposition, forming consequently a septum dividing the vagina into two canals. The lower portion is strengthened by an operation on the perineum to narrow the vaginal outlet. This is a procedure which is extremely serviceable in those cases in which the climacteric is past and the woman is no longer in danger of becoming pregnant. It is, of course, as you would readily understand, an operation that might be attended with serious consequences in a woman during the child-bearing period, inasmuch as the existence of such a septum would necessarily greatly complicate delivery of the patient.

The patient upon whom I operated was seen two years afterward, when the uterus was found on the upper portion of the vagina, greatly atrophied, and the woman was able to resume her duties as a domestic without any inconvenience whatever. This patient I shall bring before you in a few days, if she is willing to consent to an operation, and will subject her to the operation we have just indicated.

PUERPERAL SEPTICÆMIA REQUIRING ABDOMINAL SECTION.

Three days ago, I operated upon a patient for a condition of so great interest that I feel that it would not be time lost to give you a history of the case and the plan of procedure. The woman was a patient of a gentleman engaged in a large practice in this city, and was delivered some four weeks ago of a still-born child which presented by the breech. The labor was quite difficult, was completed by instruments, and was followed in a few days by considerable elevation of temperature; the patient complained of pain over the abdomen, particularly in the right side, and there was not at any time any marked offensive odor. She was promptly placed upon vaginal irrigation and measures instituted to decrease the temperature. I saw her the sixth day after the delivery, when she had a temperature of 105.° We at once began the intra-uterine irrigation, and the use of salines, which resulted in decrease of temperature to nearly normal. This, however, within a few days again ascended, when she was placed under the influence of an anæsthetic and the cavity of the uterus carefully curetted with the finger, a large amount of débris and broken down membranes removed, the uterus irrigated with sublimate and afterwards peroxide of hydrogen, and then a rope of iodoform gauze carried to the fundus of the organ.

Her temperature the following day was below 100 and the second day, normal. The gauze was then withdrawn and intra-uterine irrigation again practised. Her temperature again began to increase, pain was more marked on the right side and we were finally driven by the indications of septic disease to the conclusion that it was necessary to resort to section of the abdomen with a view of removal of whatever might be the offending cause. We were inclined to believe that it would be the supra-vaginal removal of the uterus. In performing the operation, the patient was placed in the Trendelenburg position—that is, upon an inclining plane, the lower part of the body at an angle of forty-five degrees, so that the light from the window would fall directly into the pelvis. The abdomen was opened, and scarcely was the right wall lifted up until the discharge of the pus was observed. The intestines were hastily covered over with a cheese cloth towel, the pus sponged away, the opening effected and the abscess thus emptied.

Quite a large quantity of pus was removed from the abscess cavity, which was found to

consist of the right tube and ovary. These were enucleated, raised up, the pedicle ligated and their removal accomplished. In ligating the pedicle it tore off from the side of the uterus flush with it. As there was no pedicle, the bleeding from this was controlled by continuous catgut suture sewing the peritoneum over it. Bleeding was effectively controlled, the patient lowered, the cavity thoroughly irrigated and a drainage tube inserted.

Her temperature the following day ran up again to 103°, but under the influence of antipyretics it had fallen in the evening to nearly normal. Since that time her temperature has ranged from 95⅘° to 101°. Her condition in every respect is very greatly improved, and the chances for her recovery now seem to be quite favorable.

I recount this case as an illustration of what I have repeatedly told you in these lectures, of the importance of thoroughly clearing out the uterus early in septic cases to prevent the extension of inflammation to the tubes and ovaries, and in those cases in which there is indication of such extension, to use prompt measures to bring about the early removal of the secondary foci before the system of the patient is thoroughly poisoned.

COMMUNICATIONS.

A DISCUSSION ON PHAGOCYTOSIS AND IMMUNITY.*

At the Pathological Society of London, February 16th, 1892.

THE PRESIDENT (Sir G. Murray Humphry) introduced the subject in a few words, in which he stated that the discussion was to show how the blood dealt with morbid material introduced into it. He then called upon Dr. Sims Woodhead, who delivered the following address:

II.—G SIMS WOODHEAD, M. D.
Director of the Research Laboratory of the Conjoint Board of the Royal College of Physicians and Surgeons.

Mr. President and Gentlemen:—I am sure we all have some little difficulty in approaching the questions that must be asked and satisfactorily answered before we can arrive at any definite conclusion as to the part that phagocytosis plays in the production of immunity against specific infective diseases. As in all great questions of this kind, the personality, energy, and ingenuity of the supporters of opposing theories have much to do with the temporary success of one or another system, though not with the ultimate result of any controversy. It is easy to prove anything to the credulous, but the proof of it to those who are neutral or who are absolutely incredulous is an entirely different matter, but certainly a much more satisfactory one; and I would here say there is no more satisfactory man to deal with than a friendly unbeliever. His objections stimulate our invention, and his candid criticism tests to the full not only our logical capacity but the soundness of our thesis. It is in that spirit of friendly unbelief, I hope, that we shall attack the arguments of those with whom we cannot agree; that we shall point out the errors of experiment, the faulty deductions, both direct and indirect, and that at the end of the discussion each one of us may carry away some additional facts, some new ideas, and the conviction that if some of our experiments are without flaw, others, interpreted in the light shed on the subject by other workers, may with advantage be repeated under various modified conditions and with the exclusion of any factors by which some of them at least may be rendered fallacious. It is impossible to discuss the relation of phagocytosis to immunity without introducing much concerning chemotaxis, and what has very aptly been spoken of as the humoral theory of immunity: the former of these is not antagonistic to, but may be actually looked upon as an essential part of, phagocytosis. The latter, however, is held as being in direct opposition to Metschnikoff's theory, though an attempt is now being made to combine the two; an attempt which, though up to the present unsuccessful, or, perhaps, one would say founded on little experimental basis, is gaining ground with those who, with the observations and deductions of the earlier investigators at their disposal, have taken up the matter. It would obviously be of no advantage that I should now attempt to make any suggestion even as to which theory—the "phagocyte" or the "humoral"—is supported by the bulk of evidence; though it will be gathered from the short summary here given of the work that has already been done that I lean to the theory of phagocytosis. Although Metschnikoff and Buchner may be looked upon as the present leaders in the two camps, a considerable amount of work preceded their scientific generalisms, and numerous observers are now engaged in testing the accuracy of their observations and deductions, and by improved methods are confirming or disproving the value of the earlier experiments.

From Brit. Med. Jour.

Taking first the question of phagocytosis from its physiological standpoint, and quite apart from its bearing on immunity, it has long been recognized that inert particles finding their way into the animal system, or even introduced into the blood immediately after it has been drawn from the body of the newt, say, are rapidly taken up by leucocytes, and, in the body, from them, by the connective or other fixed tissue cells. A similar process has been observed by every pathologist who has examined a healing wound, a section of the lung, or the cells of a normal spleen. The significance of this process was first pointed out by Haeckel, who, comparing the leucocyte of the newt with those of the lower amœboid organisms, indicated that this must be the remaining evidence of a normal process of nutrition common to amœboid cells in whatever position they may exist; these cells, taking the vermilion or carbon particles, merely affording a better demonstration of what is always going on in most amœboid cells.

Then came the observation that the vacuoles in leucocytes appear to be associated with the digestive and metabolic processes, partly as reservoirs for the accumulation of a digestive fluid, but more frequently for the accumulation of effete products.

ROSER'S EARLY OBSERVATION.

Attention was first drawn in 1881 to the part played by phagocytic cells in the production of immunity by Carl Roser, who, in an exceedingly interesting article, gave examples of the possession of this phagocytic power by the cell of both plants and animals, and of its importance in the resistance by them to the attack of the pathogenic fungi by which they are sometimes invaded. He maintained that the mobile amœboid cells of the animal body have the power of incepting, digesting, and assimilating even those living active micro-organisms which in non-resistant or non-immune animals have the power of withstanding the attacks of the devouring cells, and of continuing their existence and carrying on their specific functions in the tissues and fluids, where, as he found, they give rise to their characteristic products and set up the special manifestations of the disease with which they are associated; and he maintained that, as the result of his observations, he was convinced that this power of taking up such micro-organism must be an essential factor in the immunity enjoyed by non-susceptible animals. It was at this point that Metschnikoff—to whose patient researches, fertile and ingenious experiment, and brilliant powers of deduction we owe much of our knowledge of phagocytosis—took up the question, and, approaching it entirely from the experimental and biological sides, was able to build up, first, a theory of phagocytosis, and then of phagocytic immunity.

METSCHNIKOFF'S RESEARCHES.

He confirmed Haeckel's observations, and further demonstrated the fact that certain amœbæ and flagellated or ciliated unicellular organisms in the normal condition depend for much of their nourishment upon bacteria and fungi, which they destroy in large numbers, taking them into the substance of their protoplasm, extracting from them all nutritive substance, and then throwing out such matter as they cannot utilize. One of these small monads was observed to take into its substance within a few minutes filaments of leptothrix ten times its own length. This observation is one of prime importance, but one which we are apt to lose sight of in view of the apparently more interesting questions that have arisen in connection with the destruction of pathogenic organisms. Here we have unicellular animal organisms composed of imperfectly differentiated protoplasm, utilizing as nutritive material vegetable unicellular organisms, taking them into their substance and rejecting what they do not require.

It can scarcely be maintained for a moment that these leptothrix filaments are deprived of their vitality before they are incepted by the amœbæ, and we must therefore accept it as proved that these masses of elementary animal protoplasm can deal with living vegetable protoplasm as a nutritive material, the process of digestion going on within the cells, which do not act merely in self-defence in taking up these lower bacteria or fungi, but are actually dependent upon the process of ingestion and digestion for their nutrition.

It is not necessary here to multiply examples of this process, as Metschnikoff's elaborate researches on this point, quite apart from the many who have followed in his footsteps, place the matter beyond all doubt. Here then is the first fact—that these amœboid cells retain their activity and their functions, whilst the vegetable cells which they ingest are completely destroyed. Going a step further, Metschnikoff demonstrated that one of the layers of special differentiated cellular tissue met with in sponges, the mesoderm cells of which the animal is in great part composed, may still retain this power of ingesting foreign particles, each cell in this mesoderm layer playing the part of a

single amœboid protozoa, and he showed that they depend for their nutrition upon this intra-cellular digestion.

PHYSIOLOGICAL PHAGOCYTOSIS.

Phagocytosis in these cases, then, is not, as I have elsewhere stated, an isolated factor or a function brought into play for a solitary or rare occasion, but it is a habit upon which the animal cell depends for its very existence. This fact is more important when we bear in mind that any "fundamental" function of undifferentiated protoplasm is comparatively easily stimulated into activity when its presence is again required. It is a fact upon which the very foundation of the phagocytic theory depends.

Some time ago, whilst watching the development of the ova of the cod with Brook, of Edinburgh, the process of intra-cellular digestion was pointed out to me as occurring at certain stages in the whole of the cells of which the embryo is composed, small particles of yolk substance being taken into the actively proliferating cells and clear vesicles, which we can look upon as playing the excretory function, making their appearance. Later, however, where the cells are becoming differentiated, the intracellular digestion is confined almost entirely to the mesoderm cells; if we examine the parablast layer, the process of intracellular digestion is exceedingly well marked, the granules of yolk and the vacuoles standing out very prominently.

All will accept it as proved that in the metamorphoses of the tadpole, and of certain larval forms of insects, into fully developed forms, phagocytosis plays a most important part; but here it must be remembered that we are dealing with dead or partially devitalized tissues—tissues which have played their part, and are now to be looked upon as effete matter, and therefore not to be classed under the same heading as living active bacteria. Degenerating muscles, nerves, and fascia are devoured by active amœboid cells, and in this way the rapid removal of effete material is effected, an enormous number of phagocytes congregating to carry on the work at those points at which organs or parts are to be got rid of.

By a very natural extension, the part that this process of phagocytosis plays in the removal of dead or effete tissue after injury or disease has been also traced, the destruction of the myeline sheath of nerve fibres by amœboid cells, the absorption of bone by the large multi-nucleated cells that lie in Howship's foveolæ or lacunæ, the similar cells observed in myeloid sarcoma, especially in various tumors of the jaw, where absorption of the bone is going on rapidly, the inception of fragments of yellow elastic fibre and the absorption of muscle, not only in the tadpole's tail, as observed by Metschnikoff and others, but also in the inflammatory process set up by the trichina spiralis, as worked out so beautifully by Soudakewitch and in the involuting uterus by Helme, and others have all been followed out. Bevan Lewis has also shown that the connective tissue cells in the brain appear to exert a similar function in the removal of effete nerve structures, a most important point when considered along with the "associated fibres" and the part that they play in intellectual processes.

THE SOURCE OF MACROPHAGES AND MICROPHAGES.

Although in the first instance much stress was laid upon the leucocyte Metschnikoff, even in his earlier papers, and later Wyssokowicz, evidently had in view the fact that many of the cells were not true leucocytes, but that they were derived in some way or other from the fixed tissue cells, which appeared to undergo marked change under stimulation; they proliferate rapidly, they lose their specialized forms, their branching processes disappearing and the nucleus occupying a relatively large portion of the body of the cell; this nucleus as a rule remains single, but in all other respects these cells approach very nearly to the ordinary leucocyte, especially as they assume the specialized amœboid activity said to be so characteristic of the small cells. The single nucleated macrophages as distinguished from the small multi-nucleated microphages or leucocytes must indeed be looked upon as the final phagocytes, though, as we shall afterwards see they appear to have less marked powers of taking up living protoplasm than the leucocytes themselves, which in all essential respects approach much more nearly the primitive amœboid cells of the mesoderm cells of the sponge than do the large macrophages. The nearer the microphage under stimulation approaches the macrophage the more aggressive does it become and the less is it content to take up simply effete matter.

Even under normal conditions then these mesoderm cells, according to Metschnikoff, have as one of their functions the inception of all those solid parts of the organism that have became effete or useless, and where they are unable to carry out this function as individuals it would seem that they may combine in order to attack with greater certainty of success. As examples of this in the inverte-

brate kingdom, Metschnikoff points out that the mesoderm cell in the sponge may form a kind of network around bundles of leptothrix, gradually bringing about its destruction. In the same way it has been pointed out by Geddes that particles of organic or other matter, when introduced into the abdominal cavities of certain of the echinoderms, may, if small, be taken up by single cells, but where larger masses have to be dealt with a considerable number of such cells appear to run together, the protoplasm becoming fused into a large plasmodial mass, in which the individual nuclei of the original cells can scarcely be seen. Elsewhere I have indicated the part that myeloid or giant cells play in the absorption of bone and muscle and also in the parablasts of the ovum of certain fishes. In this latter case, however, the multinucleated cells, in place of being formed by single nucleated cells, running together, are the result of partial segmentation, the nuclei dividing but the protoplasm remaining as a single mass.

All this, however, has not led us beyond the point that amœboid cells in the higher animal organisms have the power, or rather the function, of removing innocuous material —organic or inorganic—or at any rate material that has, in the quantities in which it is usually present in the organism, no deleterious effects on the phacocyte cells. This is a perfectly different function from the phagocytic function that is exerted by the single-celled amœbæ or by the mesoderm cell of the lower invertebrate, which actually attack living organisms and depend on this power in a very large degree for their nutriment. We can readily understand how, in the process of development, where this attacking power is to a certain extent lost, as it is no longer necessary for the nutrition of the organism, the scavenging power may still remain in order to get rid in the most economical fashion possible of dead or inert foreign particles of chemical products and of effete materials of various kinds. Although this attacking power has in great measure been lost through disuse, it must still be remembered that it remains as one of the potential faculties of the primitive protoplasm, and that under suitable conditions it may again be brought into play; and, as Metschnikoff holds (and this is the key to his whole position), under certain conditions of stimulation the scavenging phagocytes may regain their original attacking function to such an extent that they may not only remove dead tissue and innocuous micro-organisms, but they may actually attack, ingest, and destroy micro-organisms to which, under ordinary circumstances, they would exhibit the greatest aversion, or, if these are brought into contact with them, to which they would succumb. We have here stimulation, but, as will be pointed out later, it is a special stimulation, and a stimulation that must be commenced gently and carried on for some time, increasing gradually, so that we may say there is a gradual preparation of acclimatization of the leucocytes before they can contend at all successfully with pathogenic micro-organisms, and before they can regain their phagocytic functions from the nutritive point of view, a function that may become so marked that the secondary or scavenging function is relegated to a comparatively unimportant condition.

TISSUE RESISTANCE AND TISSUE CELLS.

Tissue resistance, which may be translated as the power of reaction of cells, is necessarily intimately bound up with their life-history, with their powers of nutrition, with the facilities that they have for the excretion of effete matter, their power of taking up foreign bodies (such as pigment, bacteria, and the rest), and with their capacity for converting these into inert matter, and afterwards for utilizing them for their own purposes, and of getting rid of them. Even the physical surroundings of the cells, and, as we see, the reaction of certain chemicals on the protoplasm of the cells may interfere very greatly with some of these functions, and W. Pfeffer, in his careful observations on the action of aniline colors on vegetable cells, has pointed out what a great part the osmotic condition plays in inducing the absorption and retention not only of coloring matter held in solution, but also of solid particles brought in contact with the cells. He found, for instance, that on placing the cells of root hairs (and other vegetable cells easily examined) in a solution of 3 per cent. of saltpetre or of citric or malic acid, methylene blue, which under ordinary circumstances is taken up with great avidity by the protoplasm of these cells, is utterly rejected. The same appears to hold good in the case of solid particles. So far as one can make out from a careful study of the different results obtained by different experimenters, some such conditions as these have also played a part in determining the inception or rejection of living bacteria by the phagocytes.

It is not here necessary to repeat Metschnikoff's original experiment made on the water flea—the daphnia—with the monospora dicuspidata—a form of single-celled yeast plant—but I would advise all who have not

read his interesting paper to make themselves thoroughly acquainted with the most fascinating account that he gives of the behavior of the needle-like spores of this parasitic yeast in the body cavity or in the tissues surrounding the intestine of its host. He shows how the small spore is taken up by the colorless blood corpuscles or by the connective-tissue corpuscles where the spore succumbs, and how it is developed into red-shaped vegetative form where these phagocytes, owing to weakness or number, are unable to deal with them. Upon this observation Metschnikoff's phagocytic theory of immunity was based, and it led to a series of the most ingenious and well thought out experiments that we have had since Pasteur's classical experiments in connection with fermentation and the production of disease.

I have pointed out elsewhere that erysipelas has been taken by the opponents of the theory of phagocytosis as an example which supports their contention that phagocytes play only a secondary part, and that entirely a scavenging part, in the process. They point out truly enough that the streptococci in erysipelas are outside the zone in which the leucocytes are collecting, and that there is little or no evidence of inflammatory reaction for some time after micro-organisms have made their appearance in the lymph spaces. They say, therefore, that if the cells in the inflammatory zone play any part at all it is only that of incepting the micro-organisms that have been destroyed by the fluid elements of the lymph or blood. But it may be here observed—to use a homely phrase—that what is "sauce for the goose ought to be sauce for the gander," and that we have no more evidence of destruction by the fluid elements in the spreading erysipelatous zone than we have of their destruction by the leucocytes; whilst we have evidence that as soon as the tissues are stimulated to react in the zone outside the proliferating micrococci, the conditions under which the cells can carry on their phagocytic functions become more favorable, with the result that the disease is localised. But of this I leave others who have worked at the subject to speak for themselves.

Let us see on what Metschnikoff depends for the proof of his theory of phagocytosis, and at the outset we may indicate that he draws a marked distinction between leucocytes and those cells derived from connective tissue—a distinction, however, which does not seem to hold good in all cases, as it is evident from what we know of the life-history of cells that extremely rapid proliferation of the connective tissue cells may take place under stimulation. Metschnikoff, indeed, indicated very early that many of the processes connected with the removal of the tadpole's tail were carried on by the larger fixed cells—a fact that was afterwards accentuated by Wyssokowitscky, and again by Helme in connection with the absorption of muscular fibre, by Metschnikoff himself, and by Soudakewitch. However, we will take the leucocytes as representing the phagocyte cells, and anthrax—a disease with which most work has been done—as the typical disease. In immune animals anthrax bacilli, which may be deeply stained with vesuvin or methyl blue, are invariably found within these cells, not only at the point of inoculation, but also in the blood. It has been stated that this coloring of the bacilli by aniline colors is no proof that the organisms were not killed before they were taken into the substance of the cell—a perfectly legitimate criticism, as we know that bacteria killed by heat, by chloride of mercury, or by absolute alcohol will readily take up the various staining reagents. It has been proved by Mitchell Prudden and Hodenpyl, that tubercle bacilli killed by being boiled for two hours and then injected into the circulation of an animal still take up aniline stains, and may often be seen as brilliantly stained rods lying in the tissue spaces, and in some cases actually within the cells, six weeks after injection.

THE ACTION OF PHAGOCYTES ON BACILLI.

This at first sight would appear an almost insuperable difficulty, but Metschnikoff overcame it by showing that bacilli in the leucocytes taken from immune animals still retain their power of vegetative reproduction by the following experiment. He placed some of these leucocytes containing bacilli on a warm stage under the microscope and by most delicate manipulative measures he was able to isolate three cells, each of them containing anthrax bacilli; each of these cells was taken up in a sterilized capillary tube, was then transferred to nutrient bouillon, and was watched under the microscope, the bacteria were seen to develop in length, and then when these were transferred to larger quantities of nutrient medium, a pure culture of the organism was obtained. Further, he has demonstrated that in immune animals the process of digestion goes on first in the leucocytes or microphages, but that afterwards not only microphages with their contents, but also other bacilli are taken up by macrophages, which appear to be derived rather from local fixed cells, though some of course may come from a distance.

Another proof that the micro-organisms are alive and probably active is found in the fact that although in most cells bacteria are undergoing degenerative changes they do not take on staining material at all readily, their protoplasm is becoming granular, or a great part of it has become absorbed, nuclei of the incepting cells still remaining distinct and deeply stained, vacuoles associated with rapid metabolic changes also being present; in some cases the cells are being actually broken down whilst many of the bacteria within them are as perfectly stained as are those taken from a young pure culture. This appears to be the case especially where a large number of bacteria are contained within each cell and where it would appear that the protoplasm of the cell has become exhausted through over-stimulation, and where in consequence the bacteria have gained the upper hand.

Frank, as the result of his experiments on white rats, in which he was able to obtain the death of one only out of twenty-two, although all the others had local anthrax lesions, maintained that the bacilli were killed *in situ* by the bacteria-killing serum which passed through the spaces in which the bacteria were confined. He says, however, that although they were localized first by the density of the tissues in this region, and secondly by an accumulation of leucocytes around them, in none of these leucocytes was he able to demonstrate the presence of anthrax bacilli. Metschnikoff, on the other hand, working under similar conditions, found that in the cells that accumulated in this part it was a comparatively easy matter by means of the use of special staining reagents, such as methylene blue, to determine the presence of bacteria in these cells, which he therefore holds are true phagocytes, and he further argues that Frank's experiments, in place of being contradictory, bear out his theory in a most remarkable manner.

CHEMOTAXIS.

It has for long been known that certain lower organisms exhibit a certain liking for certain substances, whilst for others they have an instinctive aversion, and from what has been observed it would appear that they are specially attracted to nutrient materials (trophotaxis). They maintain a marked indifference as regards substances from which there is nothing either to gain or to fear, whilst for other substances, most of which seem to exert some paralyzing or other deleterious effect on the cell, they evince the greatest dislike. Gabritchevsky, in summarizing this chemotactic action of leucocytes, gives a very good account of what has already been done (Adami gives a short abstract of this paper in the first part of his communication on immunity which appears in the *Manchester Medical Journal*). De Bary observes that in myxomycetes there were certain solid substances which, when brought near the plasmodium, exerted a vigorous repellent effect, the plasmodium in the first instance getting out of its way as rapidly as possible. If, however, these substances, with definite chemical characters, were introduced sufficiently gradually, the organisms would, after a time, become habituated to their presence, and would then actually take them up into their protoplasm. Metschnikoff, going out from his observations, had already conceived the idea that the acquired immunity against certain diseases might be due to a similar process of acclimatization of the cells, so that they are enabled to carry on their phagocytic functions in the presence of what, under ordinary conditions, would not allow them to come into sufficiently close contact to permit of their ingesting the microbes. This process of acclimatization can undoubtedly be brought about if the conditions be modified gradually and slowly, and it is now well known that cells, which at first would be quite unable to react in the presence of a specific poison, may ultimately be able to withstand large doses of it, and exert their special phagocytic function in its presence.

We have now numerous examples of the fact that if doses of poisons, produced by a specific bacillus, paralyze the amœboid cells, these same cells may by careful preparation, by the administration of repeated—at first small but gradually increasing—doses of the same poison, be so habituated to its presence that, after a time, the paralyzing effect is no longer excited, and the phagocytes are able to treat pathogenic organisms as comparatively inert foreign bodies, and the disease is kept under by the destruction of these organisms by the phagocytic cells. The organisms may remain in the body for some time, they may reproduce their poison, but the prepared cells are now able to carry on the scavenging functions even under these disadvantageous conditions, and in time the whole of the bacilli are taken into the cells, and, being unable to reproduce at any great rate, are gradually destroyed.

ANTIBIOTIC SUBSTANCES.

In marked opposition to Metschnikoff's phagocytosis theory, it was early brought

forward by Emmerich and Mattei that the property of destroying bacteria rested in the fluid constituents of the blood. They first maintained that these *antibiotic* fluid constituents were the result of the activity of the bacteria themselves; in fact, they took up the retention theory. After further observation, however, they receded from this position, and came to the conclusion that the *antibiotic* substances were formed by the living cellular elements. Following them, Flügge, Nuttall, and Nissen, who were afterwards joined by Buchner and others, described a bacteria-killing substance which was present in the blood of immune animals not only while it was circulating in the vessels, but also after it was withdrawn and had practically undergone coagulation, the serum being separated from the corpuscles—in which condition the blood might be said to have lost all traces of vitality. They hold, therefore, that a certain quantity of a toxic material, which apparently has little or nothing to do with the blood as a living tissue or fluid of the body, (in this differing from von Fódór's original idea, which was that there existed in the blood plasma a vital element which killed off the micro-organism). Following this up, Buchner maintains that the cause of recovery from an attack of an infective disease is directly due to a bacteria-killing action of the serum, and he further holds that phagocytosis is brought about merely by the dead microbes giving up their proteins, which, acting chemically in a positive manner, draw the leucocytes to the point at which the organisms are breaking down; here the leucocytes take them up and ultimately digest and get rid of them, so that he looks upon phagocytosis merely as the result, first, of chemotaxis and, secondly, of an effort on the part of the organism to get rid of the devitalized microbes. He admits that phagocytosis occurs only in those cases in which an effort is made on the part of the organism towards recovery, and that it is present only where an animal enjoys a certain immunity.

POSITIVE AND NEGATIVE CHEMOTAXIS.

Buchner holds that phagocytosis is entirely the result of positive chemotaxis, which in turn, so far as micro-organisms are concerned, can only be influenced by their proteids. The specific toxines can have little or no influence on the process. In support of this position he points out that Roux and Metschnikoff, both of whom believe thoroughly in the importance of the *rôle* played by the phagocytosis in the production of immunity, appear to hold different views as to the chemotactic action of these toxines on leucocytes—Roux indicating that they have a positive action; Metschnikoff, on the other hand, leaning to the opinion that they are negatively chemotactic, and that they repel the leucocytes. This, however, does not appear to be an insuperable difficulty, for we have ample evidence from numerous experiments that have been carried on that the same substances in different strengths of solution and under different conditions may exert very different chemotactic actions; and where one strength of solution may actually repel leucocytes, a more dilute solution may cause attraction. In this connection we shall probably have the pleasure of seeing some of Dr. Ruffer's specimens, in which may be well seen the effects of antiseptics, in different strengths, on leucocytes. I need not repeat to this Society Lister's classical experiments on the effect of heat on the movement of the cilia of a cell; but I may be allowed to notice that Schultz was able to show that the ferment power of yeast is distinctly increased by the addition of extremely dilute solutions of corrosive sublimate, arsenic, carbolic acid, and iodine, all of which in stronger solutions exert a very deleterious effect upon the protoplasm of the cells; he states his conclusion in the following words: "Every irritant exerts an action on every living cell in which the effect in relation to cell activity is inversely proportional to its intensity."

In order to overcome the objection of those who maintained that the organisms are killed by the fluids of the blood, and not by the cells, he took small boxes, made of rose pith or of the pith of the common reed (phragmites communis), placed within them the spores of pathogenic organisms, and then introduced these into the veins, into the lymph sacs of the frog, or into little pockets under the skin of immune animals. The pith, for a time acting as a filter, kept out the cellular elements, and kept in the anthrax bacilli, but allowed free circulation of fluid through its interstices. He found that not only were the organisms not injured by the fluid, but they were actually enabled to vegetate and increase—in some cases very rapidly—in numbers.

Ruffer, who will probably give you the result of his own experiments, confirmed these observations, and pointed out further that the passage of generations of certain pathogenic organisms through the fluids of the body actually rendered them considerably more virulent—a result for which we had been prepared by Metschnikoff's experiments

on the increase of virulence of anthrax bacillus passed through pigeons.

BEHAVIOR OF LEUCOCYTES OF IMMUNE ANIMALS TO TOXINES.

Roux and Metschnikoff consider that leucocytes may become accustomed to the presence of considerable quantities of toxines in those cases where there is acquired immunity, and this appears to be undoubtedly the case in many diseases. In favor of the humoral theory, the single doubtful case of the vibrio Metschnikovi can be brought forward, for here it has been shown that even a guinea-pig immune to the subcutaneous injection of the organism still remains remarkably susceptible to the action of the toxines, though even here it is maintained that if the habituation be brought about extremely gradually, the immunity extends also to the poisons. In this case, it is supposed that we have stronger evidence of the correctness of the humoral theory than in any other disease, as it is maintained by Behring and Nissen that the serum from susceptible guinea-pigs affords a favorable medium to the growth of this organism, whilst that of immune animals kills them in five hours; but, on the other hand, Metschnikoff has pointed out that the vibrio Metschnikovi will grow in its normal form in the fluids of an immune animal, although when the same organism is cultivated in similar fluids removed from the body, involution forms are frequently met with. Here then we have a marked difference in the behavior of the organism in the living medium and in the dead. It is evident, in this case, that the fluids must have undergone some marked change on leaving the body, especially when we bear in mind that the organism remains alive for at least a fortnight when introduced into the anterior chamber of the eye of an immune guinea-pig. Roger made a similar observation as regards the streptococcus growing in the serum of immune rabbits, the organism growing freely but becoming attenuated. Roger and Charrin noted the same in connection with the bacillus pyocyaneus.

It must be borne in mind, however, that even Metschnikoff does not claim that phagocytosis is the only factor in the production of immunity. He claims merely that in immune animals it undoubtedly plays an important part, as here through the agency of the leucocytes and the proliferating connective tissue cells, living pathogenic bacteria are removed from the circulation; they are prevented from germinating, and thus the number of organisms is gradually diminished. He maintains, moreover, that it is by this process of phagocytosis that diseases are localized, and that from the very fact that we have a local reaction in immune animals we have an indication that the phagocytes are reacting to prevent the spread of the organism beyond the point of its introduction, and that thus we have, as it were, a first line of defence which must be passed before the disease can become generalized; and that in the endothelial cells of the spleen, of the blood vessels, and especially of the capillary blood vessels of organs in which there is very free capillary anastomosis and slow circulation, we have what may be called a second line of defence, and that when this is broken down the animal must succumb to a generalized disease.

In a short article on the recent researches on immunity, Adami suggests that there may be an increase in the bacteria-killing power of the blood plasma through the dissolution of a number of the white corpuscles. It is well-known that the breaking down of such corpuscles sets free materials which induce positive chemotaxis, and stimulates into greater phagocytic activity those cells which remain intact. In this case there appears to be some doubt as to the increased bactericidal power as the result of the setting free of the elements of the leucocytes. Working at this from one point of view, Wright has been able to demonstrate that anthrax bacilli may actually be cultivated on the broken-down leucocytes; further, it has frequently been demonstrated that quinine in large doses exerts a very marked action in destroying leucocytes in the animal body, and for that reason it was anticipated that to this action quinine owed the beneficial results obtained from its use in certain specific fevers.

Wood and I, trying this drug in cases of anthrax, found that in every case the animals treated with quinine died more rapidly than the controls—a most remarkable fact, and one which, along with the other observation, appears to negative Adami's suggestion as to the setting free of bactericidal material from dead leucocytes. Were it proved, however, we might, from our experiments make the very important deduction that the cells in a living condition exert a greater protective influence than they do when dead and broken-down, as even the control animal, in which the quinine has not been present to help to break down the leucocytes, lives longer than that in which the bactericidal power of the fluid is supposed to be increased by the admission into it of the elements of the broken down blood corpuscles. This is the more re-

markable when we find that almost all those who believe in the bactericidal power of blood serum assign to it a much greater efficacy after it is withdrawn from the body than when it is left circulating in the vessels. They assume that it has a much greater bactericidal power, so that this power must, to a certain extent, be inhibited within the body. Even here again we are met by a difficulty as a large proportion of leucocytes remain active after they are removed from the body; in fact the changes in them appear rather to be secondary to changes in the condition in the blood plasma.

Lubarsch believes with Flügge that the bacteria-destroying power of serum is exhausted by use, and that if the number of micro-organisms introduced is larger than that with which they can deal the animal must succumb. Metschnikoff, however, has been able, in certain partially immune animals, to demonstrate the presence of living bacteria four days after their first introduction. This would indicate that in cases which recover these organisms had, as it were, been waiting their turn to be killed off, the supply of poison not being equal to the demand, or on the other hand, we must assume that there is here a condition of almost perfect physiological equilibrium, those organisms that are not destroyed being just able to produce a few more than the next batch of poison can deal with, so that, unless some other element comes in, such as increased production of poison or the calling in of the phagocytes to help in the work of destruction, the production of bacteria might go on indefinitely.

IMMUNITY PRODUCED BY VARYING PROCESSES.

One of the great mistakes that has been made, and is still made by many, is that it is assumed that immunity against different diseases may be obtained or acquired in the same way. It is evident that the processes by which immunity can be obtained must vary as widely as do the processes of disease themselves. As Lubarsch points out, tetanus and diphtheria are as different from anthrax as possible. The primary mechanism of the diseases are absolutely unlike, while the same may be said as regards typhoid and tuberculosis. Tetanus and diphtheria must be looked upon as toxæmias or septicæmias, using this term in the sense in which it was used some few years ago. The organisms which produce the poison are strictly localized to a very definite area around the point of introduction, but they form poisonous substances which, taken into the circulation, give rise to marked disturbances and degenerations, especially of the highly organized tissues, such as the nerves, muscles, and excreting epithelium. One can understand what an injurious effect such poisonous material must have on the tissue cells, and even on the leucocytes, at the point where the poison is introduced, especially if these poisons are introduced at once in a virulent form; the cells are paralyzed, they are at once attacked by the organisms, and form a nutrient substratum on which they can grow. If, however, the cells can be habituated to the presence of small doses of poison it is quite conceivable that eventually we might produce an immunity, from the fact that we had acclimatized the animal to larger doses of the poison than it could secrete when introduced; and that, therefore, the cells would be able to carry on their destructive functions, and thus get rid of the organisms before they could do any harm. As a matter of fact, it has been shown that the tetanus organism, unless accompanied by a considerable quantity of its specific poison, is absolutely unable to flourish in the healthy tissues, so that in this case, at any rate, the immunity has to be acquired against the action of a poison formed by the bacillus, and diffused into the body, rather than against the growth of the bacillus itself.

The same holds good to a certain extent in the case of diphtheria, the conditions necessary for infection by this organism appearing to be either (1) inflammations of the mucous membrane, accumulation of secretions, formation of ulcers and similar conditions, or (2) the introduction of a considerable mass of the organism, accompanied by a quantity of the specific poison. In both cases it is probable that we may actually find that in the process of rendering the animal immune we may actually set up the degenerative changes so characteristic of diphtheria.

It is probable that similar changes may be found in animals that have been protected against tetanus. Probably some of those taking part in this discussion Dr. Sidney Martin, Dr. Hunter, and others, will have something to say on this point. In the case of anthrax it is necessary to produce an immunity which (1) will localize the disease at the point of introduction, or (2) which will enable the tissues to act on the organism at once, probably in the first case through the leucocytes, for we can scarcely imagine that a sufficient quantity of the fluid elements of the blood can be brought up to attack a large number of organisms when the blood of the whole body, according to Lubarsch, can determine the destruction of only 10,000

anthrax bacilli. Even a very high degree of alteration in its bactericidal power would scarcely enable it to deal with the large numbers that may be introduced locally. Only some such factor as the bringing up of large numbers of leucocytes, which, owing to a natural or acquired immunity, are enabled to act in the presence of anthrax poison, can bring about, first a localization of the anthrax bacilli by the erection of a cellular barrier, and secondly, their destruction by a process of ingestion and digestion.

In all our researches on immunity we are confronted with the question, How is it that immunity is conferred for one disease only, or certainly for one series only? Why should an attack of vaccinia or variola be necessary to ensure protection against another attack of variola? The exhaustion of assimilation theory was early found insufficient to account for it, as it was also to explain the different action of the bacillus prodigiosus, which, whilst diminishing the action of a dose of anthrax, increases the virulence of Chauveau's bacillus or charbon symptomatique. The local immunity theory in the same way was found insufficient, and local inflammation as a factor in immunity has also had its day, perhaps, however, to be revived at no distant date. The adaptation theory or cellular chemical theory advocated by Klebs and Grawitz, Ribbert's theory of massing of leucocytes, and Metschnikoff's phagocyte theory have in turn ousted the retention theory advocated by Wernich and Chauveau, whilst the serum bactericidal theory has come forward to rout this if possible. It may be that we may have to cull something from each of several of these various hypotheses, but we must always bear in mind that the potential forms and functions of animal protoplasm are as great as the number of directions in which it actually develops. Its property of resistance to any special poison, or its power of carrying on its functions in the presence of such poison, can always be brought about by exercise. It falls into abeyance again, no doubt, when not required, but once revived it is far more readily again brought into play when again called upon. Each poison it is held develops or recalls a special resistance, and it is in the rapid development of this special resistance that immunity consists.

Even should the bactericidal power of serum be proved to exist, it must depend directly upon changes produced in the cells, changes which must be equally specific if what we think we know about immunity is at all to be trusted. Immunity is specific, whilst this bactericidal power of serum is very general in its action unless we accept it that the blood must be loaded with a fresh bacteria-killing material for every disease we contract from childhood upwards, beginning with whooping-cough and measles, and passing through the whole gamut of the ills that flesh is heir to.

II.—J. BURDON SANDERSON, M. D., D. C. L., LL. D., F. R. S.

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Dr. Burdon Sanderson stated very briefly the general grounds for not accepting the doctrine of phagocytosis. The specific power enjoyed by the organism of protecting itself against the exciting causes of specific diseases was, he said, admitted by all pathologists. It was also admitted that the intervention of leucocytes is associated in many instances with the successful exercise of this power by the organism. In these instances the action of leucocytes is recognized as beneficial, but many pathologists decline to vest in them protective power or to recognize any direct relation between their activity and the specific exciting causes of specific diseases; and attribute the phenomena of phagocytosis to the ordinary endowments which leucocytes manifest, not merely in disease, but under normal physiological conditions, such for example, as those under which they act in the processes by which effete structures are absorbed. Unless it can be shown that this is not the case, there is no reason for assuming the existence of those special endowments by which, according to the theory of phagocytosis, they are enabled to act independently of the organism for its protection.

III.—E. KLEIN, M. D., F.R.S.,

Lecturer on General Anatomy, etc., St. Bartholomew's Hospital.

Dr. Klein admitted his inability to accept the argument advanced by the supporters of the phagocyte theory, and in support of his position he stated that the question of phagocytosis embraced a very much wider field of observation that was included in the views already advanced. Some investigators included all instances in which bacteria were found engulfed in cells. This, he contended, was the first error, and illustrated his remark by exhibiting a number of photomicrographs showing a dozen instances of micro-organisms contained in cells which were breaking down under their influence, thus reversing the process described. He

said, that the influence of chemotaxis, as shown in the cells of bileducts in which psorosperms were growing, was of quite a different nature to that asserted. In the many cases of immunity in which inoculation was not followed by disease, were the bacilli killed by leucocytes, by some other agent, or by the two in combination? He referred to the experiment of Emmerick and Mattei in which it was shown that the micrococcus of swine erysipelas which would kill a rabbit when injected subcutaneously, did not do so when introduced into the circulation, and further, that an animal so treated acquired immunity from infection by some subsequent inoculation, and that phagocytes cannot then be found at its site. Reference was made also to the observation of Metschnikoff that after forty-eight hours living bacilli can still be found in the blood of an immune animal; but it was stated that in such cases there was not a commensurate number of cells containing the micro-organisms. In the dog, cat, and rat, which were insusceptible, it was extremely difficult to find any adequate number of bacillus-bearing cells after inoculation. In the next place, he would ask if there were any well-established cases in which bacilli were known to have been destroyed by lymph or other juices; and here he alluded to experiments being carried out by Dr. Fred. Andrewes, and which showed that pus, already dead, and even when twenty-four hours out of the body, had a rapidly noxious effect upon these organisms. When anthrax was introduced into the dorsal lymph sac of a frog, it was hours before any bacilli were seen inclosed in cells, the lymph itself being capable of destroying them.

Professor Klein then gave an account of some experiments in which it was found that a rapid diminution in bacilli occurred within two hours of introduction into the body, which was not at all in accord with the time observed in their gradual approach and engulfment by cells. He thought it was much simpler to assume that the juices of the body were germicidal, though Buchner's explanation gave little account of what took place with regard to the bacilli after they were weakened by exposure to them, as to whether they were then taken up and carried away by cells acting as scavengers. That important part of the cell's duty had yet to be proved.

IV.—A. A. KANTHACK, F. R. C. S.,
John Lucas Walker Student in Pathology, Cambridge University.

Taking phagocytosis in connection with immunity to mean the ingestion and destruction of living micro-organisms by certain wandering or fixed cells of the body, I assume that, at the present date, no doubt exists as to the occurrence of such a phenomenon. Phagocytosis is almost consistently observed in cases where an animal recovers after being inoculated with a pathogenic germ, or where an animal, artificially or naturally immune, is inoculated in the same manner. It has been claimed that phagocytosis is the chief, if not the only, factor in the acquisition of immunity.

I would abstain from alluding to the origin and nature of the phagocytes, were it not that Dr. Ruffer—as far as I can follow him—asserts that all phagocytes, including microphages and macrophages, plasmic and epithelioid cells, are derived from leucocytes. On the contrary, there can be no doubt that the plasmic and epithelioid cells, observed during inflammation and regeneration, are derived from the fixed connective tissue cells *in situ*. This has been shown by the researches of Grawitz, Ziegler, Nikiforoff, Bardenheuer, and also by Messrs. Ballance and Sherrington. Personally, I have on several occasions repeated the experiments of Grawitz and Bardenheuer, and cannot accept Dr. Ruffer's views.

The question at issue is "whether immunity from infective diseases or lesions is caused by phagocytosis, that is, through the phagocytes alone, and through nothing else." Though phagocytosis may be constantly observed in immune animals, it may for all that be simply a concomitant physiological effect or change due to the acquired immunity.

I shall only discuss acquired immunity, for it is evident that the only logical method to study the process of acquiring immunity is by means of considering the changes in the organism while passing from a non-resistant to a resistant state. Personally, I think that at the present state of our knowledge, we cannot accept any one theory as exclusive, but though acknowledging that phagocytosis is of great importance as a protective mechanism, I am unwilling to accept the exclusive phagocytic theory, believing that the acquisition of immunity rests on a much broader basis than the voraciousness of the leucocyte.

I shall discuss only three chief points, as it is impossible to allude to all the various matters in the short time alloted to me. These points are: I. The Influence of the Body Fluids; II. Chemotaxis; III. Phagocytosis.

I. Do the living fluids of the body play no part in the production of immunity?

The serum of many animals has a marked bactericidal power outside the body, but we cannot establish any general law, because there is no necessary correlation between the natural insusceptibility of an animal to a disease and bactericidal power of its serum over the microbe causing such disease. This has been put forward as a grave objection to the so-called humoral theory. But I think wrongly, for it is to my mind impossible to draw any logical inference as to the artificial causation of immunity by contrasting a naturally immune animal with a naturally susceptible one. In future, experiments should be made in such a manner that the bactericidal power of the serum of a naturally susceptible animal be tested (*a*) before it has been immunized, and (*b*) after it has been artificially immunized.

If, then, any law can be established, we must expect to find one or more of three conditions—namely, after the acquisition of immunity, the serum should be:

(1) either more bactericidal,

(2) or possess greater attenuating powers,

(3) or possess greater destructive power over the toxines of the microbes.

It is too narrow to judge by the bactericidal power alone, for it is impossible to disconnect the bacteria from their metabolic products, and it is these which cause the disease. As long as the poison is not neutralized it matters not whether the bacilli are eventually killed or not.

To give examples, we find—

(1) Under the first head that

(*a*) the serum of the guinea-pig after immunization kills the vibrio Metschnikovi;

(*b*) the serum of a guinea-pig after immunization has greater bactericidal power over the Chauveau bacillus.

As an exception, we may mention the serum of a sheep protected against anthrax. But, on the other hand, Christmas succeeded in extracting from the organs of an immunized rabbit a substance which had greater destructive power over the anthrax bacillus than a substance similarly extracted from the organs of a rabbit not protected against anthrax.

According to Bouchard, it has been proven for nine infective processes that the serum of the immunized animal has greater bactericidal power than the serum of the same animal in the non-immunized condition. These are anthrax, charbon symptomatique, cholera, erysipelas, diphtheria, tetanus, pneumonia, and the lesions caused by the vibrio Metschnikovi and the bacillus pyocyaneus.

(2) Under the second heading, we find that

(*a*) the serum of the immunized rabbit attenuates the streptococcus of erysipelas;

(*b*) the serum of the immunized rabbit attenuates the bacillus pyocyaneus.

(3) Finally, under the third heading, we find that

(*a*) the serum of an immunized animal neutralizes the tetanus toxine;

(*b* and *c*) the same has been asserted with regard to the toxines of diphtheria and pneumonia.

Experiments in this direction and on these lines should be extended.

Now it is true that an experiment in a test tube with *post-mortem* or dead serum we cannot immediately apply to the changes and action of the living fluids. But we must not be too dogmatic, and say "because the serum of the naturally susceptible guinea-pig is more destructive to Chauveau's bacillus than the serum of the naturally less susceptible rabbit; *ergo*, test-tube experiments prove nothing." Such an experiment is not crucial.

Some test-tube experiments are almost conclusive. I am alluding to the action on tetanus toxine of blood freshly removed from an immunized animal. Anyhow, we may claim that test-tube experiments logically conducted are suggestive, for the serum is in the first instance derived from the plasma, and if we find constant changes in one or other direction after artificial immunization, it is reasonable to suspect changes of similar nature in the plasma and body fluids also. With Bouchard we cannot possibly consider this almost constant increased bactericidal power over a particular microbe after immunization against such microbe a mere test-tube accident.

I can only allude to some of the many objections offered. These should always be examined in the light of logical evidence, and if derived from experiments on animals of two absolutely different species, of which one happens to be naturally susceptible and the other naturally refractory, they may be rejected at once.

(1) Those who object to test-tube experiments as being artificial do not hesitate to use little paper bags filled with germs, and place them under the skin of refractory or immunized animals. Such experiments are as little natural as test-tube researches, for (*a*) we thus localize the process by artificial means; (*b*) the fluid which passes through the paper may be of an inflammatory nature, and is not necessarily the same as the normal body fluids. For this reason I have not alluded to Sanarelli's experiments, who showed

by using collodion tubes that the lymph of frogs *in corpore* can attenuate, or even kill, anthrax bacilli without the aid of phagocytes.

(2) Waiving this objection for argument's sake, Dr. Ruffer claims to have disproved the protective influence of the living plasma by his latest experiments. He placed the vaccine of charbon symptomatique wrapped up in paper under the skin of an immunized rabbit, and found that even after forty-eight hours, the vaccine will certainly kill guinea-pigs. This, to my mind, proves nothing, for it is not at all necessary that the plasma or body fluids of the immunized rabbit should kill or attenuate the bacillus; the animal will survive as long as the poison is destroyed, and the immunization of the rabbit may simply have enabled the organic fluids to do this. The fact that the exudation was able to wash away a part of the metabolic products of the bacilli secluded in the paper can only be of advantage to the growth of the same.

It may be mentioned in passing that, claiming such powers for the organic living fluids as I have done, does by no means imply a retrogression to the ancient humoral pathology; for no one, I take it, denies that all our fluids are the products of cellular secretion or excretion, and this is all that cellular pathology demands.

In studying the artificial production of immunity, the absolute followers of Metschnikoff are prone to neglect the most important part of the causation of infective diseases and lesions, namely, the chemical products of the microbes which undoubtedly cause the phenomena of such diseases.

(*a*) We find that an animal made immune against a living microbe can also resist the toxine of such microbe to varying degrees. Examples are tetanus, pneumonia, diphtheria, vibrio Metschnikovi, pyocyaneus, charbon symptomatique, and others.

(*b*) *Vice versâ*, an animal made immune against the toxine also resists the living microbe. Therefore the processes responsible for these results must assumedly be the same. Now immunity against toxines cannot in any way whatever be explained by means of phagocytosis.

I conclude, therefore, that at the present state of knowledge it is impossible to assert that the living plasma (or body fluids) are of no consequence. I will not claim more for the present.

II. *Chemotaxis* has been of late introduced as a welcome support of the phagocytic theory. Certain chemical substances, according to their degree of concentration, attract or repel the phagocytes, but if the phagocytes are in a medium already containing these chemical substances, equally distributed, they will not be attracted on adding more of these substances, unless they be added in a highly-concentrated condition. Analyzing this, we have three possible cases:—

(*a*) The metabolic products of the microbe are present in equal quantity in the tissues and at the seat of lesion, therefore no migration of phagocytes can take place.

(*b*) If the degree of concentration is higher at the seat of lesion, we shall have a migration of phagocytes thereto.

(*c*) If the degree of concentration is higher in the blood, the phagocytes may migrate back into the blood.

This teaches us nothing as to the acquisition of immunity, for (1) if true, it is simply a statement of concomitant facts; (2) on such a view, our successes in the production of immunity become merely a matter of chance and good fortune; (3) it supposes, without the slightest foundation, that in an animal immunized against a microbe, the toxine of such microbe circulates in its vessels; and, lastly, it neglects the fact that besides diapedesis, we have, as a rule, hand in hand with positive chemotaxis, a great general increase of phagocytes and leucocytes, depending of necessity on a stimulation not of the luecocytes and phagocytes but of the elements giving birth to these bodies. Hertwig in his monograph sums up this theory in the following manner; "(*a*) In an immunized organism, the negative chemotaxis, which the body exhibited before being made immune, has been replaced by a chemotaxis behaving positively towards the specific virus." If so, we may ask why and how? We are also told that "effects of the metabolic products of microbes show themselves as positive and negative chemotropism and also as acquired irritability (Reiznackwirkung). The existence of positive chemotropism explains the localization of the virus through the attraction of leucocytes and subsequent phagocytosis. The existence of negative chemotropism explains the possibility of a general infection by means of a diffusion of the micro-organisms. By means of suitable injections of bacillary products a negative may be changed into a positive chemotaxis, and thus a cure be effected." This is mystical and unsatisfactory, and treats of the body as though it were a specimen on the microscopic slide.

III. We now come to the last point, *phagocytosis*. I repeat that I fully acknowledge that this exists, and also that it is an impor-

tant phenomenon during and after the acquisition of immunity, but I am far from accepting that it is the sole, or even the chief, factor active in all cases alike. The exclusive phagocytic theory is both inadequate and unsatisfactory. I will not repeat the classical objections which are always answered by the same classical arguments, but shall enumerate a few difficulties as they have presented themselves to me.

(1) By causing fever artificially in a susceptible animal; two or three hours after the temperature has began to rise considerably there is a very great increase of leucocytes, not only of the so-called lymphocytes but also of the larger elements, and this leucocytosis persists for more than twelve hours. On inoculating the animal when in this condition with anthrax, it will die just as usual. Yet here the army of phagocytes was increased at least tenfold.

(2) Thus the increased number of phagocytes *per se* is not sufficient. They require also the special training. And here we come to the most unsatisfactory part of the theory. Before the animal is immunized the phagocytes are more or less inert against a particular microbe, but as soon as ever a relative immunity is established they are extremely voracious. We must ask, why does phagocytosis appear now or why are the cells suddenly enabled to destroy what previously perhaps killed them? Metschnikoff says by means of a kind of special selection or change of habit. This to my mind amounts to saying that the cells themselves have acquired immunity; and phagocytosis instead of explaining the processes by which immunity is acquired, becomes simply a phenomenon observed during or after the process. We must also remember that in many cases after the protective inoculation we have to wait from four to sixteen days before immunity is apparent, and during this time the natural resistance may even be decreased, as Fränkel's experiments on diphtherial immunity show. Leucocytes and wandering cells are but short-lived, and as far as we know constantly replaced through continuous division of cells which form the elements of certain tissues and organs. Thus the assumed hereditary resistance must be sought at the birth-place of these leucocytes and wandering cells. If we allow so much, we might as well say the phagocytes are immune because the whole body has become immune, or simultaneously with the immunization of the organism, phagocytosis appears.

(3) The occurrence and importance of vaccine fever during the process of immunization points to more general changes than a mere change of habit of the phagocyte alone.

(4) That changes exist in all the tissues has been shown by Emmerich, who succeeded in protecting animals by inoculating them with the tissue juices of immunized animals.

(5) Some of the methods of immunization, as the injection of the so-called antitoxine, or of small repeated doses of poison, etc., point strongly to general changes in the body, the phagocytes being altered with the rest of the body.

(6) Lastly, phagocytosis does by no means explain many of the phenomena mentioned in the first part of these remarks. Other objections might be raised, but I am afraid I have been using up time too much already.

In conclusion, it seems to me that we cannot hold any one process exclusively responsible for the artificial production of immunity. The primary cause of immunity, however, must be sought beyond the leucocyte or phagocyte, and also beyond the fluids of the body and, according to the maxims of cellular pathology, depend on changes in the cell-life of the organism which at the present we are unable to understand. It is in consequence of these as yet obscure molecular changes that phagocytosis and the other phenomena observed after or during immunization appear, but none of these alone can be considered the cause of immunity.

[TO BE CONTINUED.]

PEROXIDE OF HYDROGEN.

The following formulæ are from Dr. B. W. Richardson's Asclepiad:

For Fermentative Dyspepsia:

℞
- S lut. hydrogenii peroxidi (10 vols.) ..... ℥iss.
- Spiritus vini rectificati ..... ʒ iij
- Ol. creasoti ..... ℥j vj.
- Glycerini puri ..... ʒ vj.
- Aquæ destillatæ ..... ad ʒ vj.

Misce. Fiat mistura. Dose, f ʒ j.

For Hæmoptysis and Other Hæmorrhages:

℞
- Solut. hydr. genii peroxidi (10 vols.) ..... ʒ iss.
- Tannin ..... ʒ ss.
- Glycerini puri ..... ʒ vj.
- Aquæ destillatæ ..... ad ʒ vj.

Misce. Fiat mistura. Dose, f ʒ j.

An Antidote and Astringent Gargle.

℞
- Tannin (pure) ..... gr. x.
- Glycerine (pure ..... ʒ j.
- Rectified spirit ..... f ʒ iv.
- Distilled water ..... f ʒ iv.

Solution of peroxide f hydrogen (10 vols.) sufficient for 8 fluidounces. To make an 8-ounce ga gle, to be used in the manner directed.

A Useful Collyrium.

℞
- Solution of peroxide of hydrogen (10 vols.) ..ʒ iv
- Tannin (pure) ..... gr. v.
- Rose-water ..... to f ʒ viij.

To make an 8-ounce collyrium, to be used in the manner directed.

REMOVAL OF SARCOMA OF MESENTERY AND RESECTION OF A PORTION OF SMALL INTESTINE.

By DR. JAS. McCANN,
SURGEON TO THE WEST PENN HOSPITAL.

Reported by Dr. E. E. Wible, Resident Physician.

Thomas W., a German, æt. 40, was admitted to the general surgical ward of the West Penn. Hospital on Nov. 30th, 1891. He was a married man, and was employed in a rope and cordage factory. He entered the hospital for the treatment of a tumor which he had discovered in his abdomen. His family history was negative, with the exception that his mother and an aunt had died of dropsy. As to his personal history, he said that he had had inflammation of the lungs and rheumatism some years ago. Last September, pain in his abdomen attracted his attention to a hard movable tumor of about twice the size of a normal kidney. This tumor occupied usually the right inguinal region, but it could easily be manipulated to any position in the abdominal cavity.

The existence of this tumor had not been previously suspected by the patient, who states that he has had no gastro-intestinal disturbance, but was troubled some with constipation. His general health is excellent, and he does not seek treatment on account of any pain or physical debility, but the knowledge of the presence of the growth worries him and causes him to be uneasy.

The tumor is hard and smooth, spherical in shape, and it seems at times to change its position with the peristaltic movements of the intestines.

A diagnosis of a morbid growth was made, and it was differentiated from a floating kidney by reason of the absence of any urinary trouble and its free mobility.

Dr. McCann decided to perform laparotomy for the removal of the tumor, which was accordingly done at his surgical clinic before the students of the Western Pennsylvania Medical College, on Dec. 1st, 1891. After opening the abdomen he exposed at once a tumor adherent to the mesentery and a loop of the small intestine. The tumor was partly dissected away, when it became apparent that it would be necessary to resect about eight inches of the bowels on account of the tumor being so closely adherent to it, and incorporated with the wall of the intestine. Gibson's clamps were applied to the fixed portion of the intestine to prevent fæcal extravasation during the operation of enterotomy. The bowel was then severed by scissors and a "v" shaped portion of the mesentery, corresponding with the portion of the bowel, was also removed.

The cut edges of the mesentery were then coaptated by continuous sutures after the hæmorrhage had been arrested. The open ends of the divided intestine were then united by two rows of fine silk sutures; one uniting the mucous surface with continuous sutures; the other uniting the muscular and serous coats with continuous Lembert's sutures. The incision through the abdominal wall was then closed with silver-wire sutures and a rubber drainage tube was inserted, which was removed on the second day. The operation was performed with strict attention in every detail to antiseptic precautions. The tumor weighed a few ounces short of two pounds. The microscopical examination disclosed that it was a spindle-shaped sarcoma. The patient received nothing but sips of hot water during the first forty-eight hours following the operation; he was then allowed a meagre liquid diet for the ensuing two weeks, and he then gradually returned to the use of solid food. No opiates were administered because he did not have any pain. His pulse and respiration never exceeded the normal. His highest temperature was on the evening of the seventh day when it registered 101.4°; it then gradually returned to the normal in four days and remained so henceforth. On the sixth day he had two natural evacuations from the bowels and every day succeeding had one or two evacuations.

In order that he could enjoy the association of his family on Christmas day he departed from the hospital in perfect health on Dec. 21st, 1891, just twenty-one days after the operation.

Three months after the operation the patient reports that he is at his accustomed employment every day and that he never enjoyed better health in his life.

PYOKTANIN IN OPHTHALMIC PRACTICE

As a result of the employment of pyoktanin for a period of three months in the ophthalmic service of Bacchi, Rescoussie (*Annales de la Policlin. de Paris*, 1891, No. 12, p. 549) concludes that the agent is an excellent antiseptic in ocular surgery—to be preferred to all others. It exercises a favorable influence upon simple conjunctivitis, and especially upon granular conjunctivitis. It is of doubtful efficacy in case of rebellious ulceration of the cornea, and is almost useless in case of purulent ophthalmia.

A CASE OF ACUTE PARENCHYMATOUS NEPHRITIS.

By MARTIN W. BARR, M.D.,
Brookline, Mass.

The treatment of acute parenchymatous nephritis is a series of compromises all through the whole course of the disease, and each drug given cannot be too carefully watched. So much has been written on the subject—on purely theoretical grounds—that frequently when a case of this dreadful disease comes under the care of a busy general practitioner he is bewildered by the variety of remedies presented. I have endeavored to describe this case most accurately, going into all the minute details of both symptoms and treatment.

S. T.,—aged thirty years. An unmarried gentleman of unexceptionable habits. Native of England. Had been in America about ten months. Was engaged in intellectual work for a number of years. Family history good. Patient had not been feeling well for several weeks. Complained of headache. Was irritable and listless. Sleep was disturbed at night, would doze much during the day. Appetite failed.

On May 3, 1891, complained of sore throat. On examination I found the throat much congested.

Prescribed:

℞ Fld. ext. rhus. glab.
Glycerinæ ..... ää ℥i
Sat. sol. potass. chlor. ..... ℥ij
M. Sig. Gargle every half hour.

Used gargle during day, and in the evening throat was improved. Took a walk and half-an-hour's smoke after night-fall. Retired early.

May 4th—Was dull and heavy and slept much during the day. Took but little food. In the evening had a slight chill. Became dizzy and staggered when walking. Complained of double vision. Conjunctiva much congested. Tongue was heavily coated. Gave hydrarg. chlor. mitis, gr. iii., and later, sod. brom., gr. l.

May 5th—Passed rather a restless night. Was very nervous and exhibited signs of mental disturbance. Had severe cephalalgia and aching pains in shoulders and lumbar regions. Voided urine in large quantities, but with great difficulty. The desire to micturate was almost constant, and the flow strongly resembled that in polyuria. The urine was colorless, and contained neither albumen nor sugar. Specific gravity was 1006.

Polydipsia was a marked symptom, the craving for cold drinks being most intense. This continued until convalescence.

Kept patient in bed and gave:

℞ Potass. iodidi ..... gr. clx
Syr. sarsap. comp. ..... ℥ss.
Aquæ ..... ℥iss.
M. Sig. Teaspoonful in water every our hours.

Also:

℞ Fld. ext. hyoscyamus ..... grs. xl.
Sodæ bicarb. ..... grs. xxxii.
Aquæ, q. s. ..... ad ℥i.
M. Sig. Teaspoonful in water every two hours.

In addition I used the galvanic battery, applying the electrodes alternately along the spine, and to the hypogastric, lumbar, and inguinal regions; and also to the root of the penis. I began with moderate currents, but rapidly increased them in strength. Gave milk freely.

May 6th—Patient passed a bad night. Muscular twitchings of face and limbs. For hours I momentarily expected a convulsion. Uræmic symptoms were very prominent. There was but a faint odor to the urine—breath and perspiration were strongly urinous. Cephalalgia was less severe. Vertigo very marked. Conjunctiva was a bright yellow and blood-vessels strongly injected. Disordered vision—diplopia. A *bruit* was distinctly audible in cardiac region. No fever. Pulse slow and full. Respiration during day was shallow and irregular (Cheyne-Stokes); toward evening labored. There was some delirium which was mild and muttering. Tongue still furred. Teeth covered with sordes.

Ordered tinct. digitalis, m. v., *ter in die*. In the evening gave hydrarg. chlor. mitis, gr. v., followed by a Seidlitz powder.

May 7th.—Patient passed another wretched night. Diplopia more marked. Everything appeared a bright green color. Delirium increased. Would lie muttering to himself, then suddenly have attacks of wild maniacal excitement. Had illusions and hallucinations. Thought that he had had a quarrel on the quay with some negro roughs, by whom he had been injured. Afterwards a strange man had given him a cigar and told him to go lie down in his (the man's) room. This story was repeated over and over. He held conversations with an imaginary man, clad in blue trousers, sitting on a stile. Was much interested in some black trees. Attended his own funeral. Had a severe disagreement with his brother. Was much afraid of a box, which he thought had been placed high up in a window by his head. Became violently angry with me, and, later, imagined that I was the devil. Toward evening became more quiet but insisted that he was not in his own chamber. Bowels moved freely. Urine passed in large quanti-

ties and with great difficulty. Continued treatment, and at bedtime gave: sod. brom. ʒj., and morph. sulph., gr. ¼.

May 8th.—Passed a restless night. Arose frequently to urinate. Was extremely weak and dull. Wild delirium had subsided, and given place to listless apathy. Patient lay during morning in a lethargic state, from which he could be easily roused to take nourishment and medicine. Toward noon he began to wander again. Spoke of a choir singing; held a conversation with a little child of whom he was very fond; then began to talk of suicide. Gave podophyllum gr. ¼ every hour, until three doses were taken. Bowels were freely moved late in the afternoon. Fell asleep early in the evening, waking occasionally. Recognized me. Strong urinous odor to breath and perspiration. Gave chloral gr. x, and morph. sulph. gr. ¼ at bedtime. I now placed patient on an absolute milk diet, feeding him at regular intervals. He would take seven pints in twenty-four hours. My schedule ran thus:—

8 a. m.	1 pint.
10.30 a. m.	1 "
12 m.	1 "
3 p. m.	1 "
6 p. m.	1 "
10 p. m.	1 "
During night when awake	1 "

May 9th.—No change of any importance. Hebetude of mind still continued. Heart irritable and irregular in its movements. Patient had no idea of time. Had completely lost it. Morph. sulph. gr. ½ at bedtime.

May 10th.—Slept rather better during night. Mind was wandering. Was aphonic, speech unintelligible at times. While left alone for a few minutes, escaped down two long flights of steps, and engaged in an altercation with a man whom he met. Was returned to bed much exhausted. Passed urine with less difficulty, and in smaller quantity. Bowels freely moved by hydrag. chlor. mitis. gr. iii, and podophyllum gr. ½. Stopped hyoscyamus mixture, also digitalis.

May 11th.—Much disturbed by having room changed. Toward evening became drowsy.

May 12th—Patient passed a quiet night. Abnormal flow of urine had ceased. He had an almost constant desire to urinate, but could pass only a few drops at a time. Urine of a dark red color, and was loaded with urates. Bowels freely moved, spontaneously.

May 13th.—Urinous odor to breath not so marked. But little odor to the urine. Patient was still very dull.

May 14th.—Micturition not so frequent, and only a small quantity voided at a time.

May 15th—Urinous odor rapidly disappearing from breath. Urine was a pale straw-color, neutral reaction, specific gravity 1010, and contained neither albumen nor sugar. Small cloudy sediment on standing-water. Microscopic examination revealed some pale hyaline casts. Polydipsia was still most intense. Slept much during day. In the evening had an attack of maniacal excitement which came on without warning. Had the delusion of a quarrel. Was quieted with difficulty. In the morning I gave podophyllum gr. ½, followed in half an hour by a Seidlitz powder. Full movement resulted. Stopped all other medicine and prescribed:

℞ Tinct. digitalis ..... ♏ lxxx.
Potass. acetat. ..... ʒ vss.
Aquæ q. s. ad. ..... ʒ viii.
M. Sig.—Teaspoonful well diluted every 4 hours.

This I gave between meals. Directly before each meal the patient took tinct. ferri chlor. m. x., together with Mensmen's beef tonic, ℥ jss. Immediately following the meal he took liq. potass arsenit. m. ii., in wineglassful of water. At bedtime gave morph. sulph. gr. ¼ and sod. brom. ʒi.

May 16th.—Had rather a quiet night. Mind was much lighter, although he had no idea of time. Talked coherently. Aphasia disappearing. Diplopia in less degree. Dipsomania unabated. Allowed him to get up for a few minutes. Was extremely weak. Some diarrhœa in afternoon. Promptly checked it by fl. ext. geranium maculatum, and tinct. opii m. x. to iv., every hour until took four doses.

May 17th.—Improving; delusions disappearing. Eyes clearing up, congestion less intense, yellow color fading. One healthy voluntary stool. Allowed him to smoke a little morning and evening. He also took two short walks. Much exhausted afterwards.

May 18th—Gave usual sleeping potion on previous night. Slept through the night and until 11 a. m. Is much improved in every way. Began to take solid food. Steak, eggs, custard, bread and butter, etc. Took two walks. Was not so tired after them.

May 19th.—Mind quite clear. Urine voided in normal quantities, and with no difficulty. Appetite good. Took much exercise during day. Was extremely tired at night. Gave sleeping draught.

May 20th.—Diplopia disappearing rapidly. Dipsomania is not nearly so intense. Urinous odor hardly perceptible on breath.

May 21st.—Took a twenty-six mile ride on the cars, and did much running around in the

city. The day was very warm, and in the evening patient was much exhausted. No movement from bowels.

May 22d.—Slept soundly during the night. Eyes yellow and slightly congested. Urinous odor to breath exaggerated. At 2 p. m. gave pulv. jalapæ comp. gr. xiv. Free evacuation in the evening.

May 23d.—Restless night. Urine light colored. Specific gravity, 1020. Taking nourishment freely. Good movement from bowels. On this day the patient was removed from my personal care, although I continued to prescribe for him at a distance. I followed the treatment last mentioned for a number of days, and the patient improved rapidly. About June 1st I changed treatment, and put him on the chloride of gold and sodium. The prescription read:—

℞ Auri et sodii chlorid. .....gr. iii.
Aquæ.....℥iv.
M.
Sig.—Teaspoonful in water after each meal.

When patient had finished this, I reduced dose to gr. , *ter in die.*

No inconvenience in any form was experienced from the continued use of this drug.

By the middle of July discontinued all treatment. Saw patient on August 7th. Looked well and strong. A microscopic examination of the urine was made on October 5th; a number of granular casts could be plainly seen.

At the present time of writing the patient is in splendid mental and physical condition. I have warned him of the great care he will have to take of himself.

The most curious symptom in this case was the vast quantity of urine passed in the beginning. So large was the amount that I at first thought the disease was diabetes insipidus. Usually in acute parenchymatous nephritis the flow is diminished, or suppressed entirely.

The delirium is also worthy of special notice. It was that of enteric fever, but there were no other typhoid symptoms. One thing I should *not* recommend in the treatment of acute Bright's disease—the allowing the patient to smoke. My patient was determined to smoke, and no amount of persuasion nor arguing on my part could prevent him. When I found that he was rapidly working himself into a state of mental excitement, I quietly submitted. Fortunately, no bad results followed, but it is an experiment I should not care to try again. It will perhaps be noticed that I never allowed my patient to lower his vital forces, but kept the fuel burning brightly by the forced feeding—milk and beef tonic.

A HAWTHORN TWIG IN A MAN'S EAR FOR THIRTY YEARS.

By A. O. STIMPSON, M.D., C.M., Thompson, Pa.

John Nickels, aged 74 years, came from Parkham, England, to this country some eighteen years ago, and gives the following history of himself:

"In the month of January, 1844, while forcing his way through a dense hawthorn hedge the end of a hawthorn twig entered his ear and broke off, causing him considerable pain at the time. After he had returned home it had bled quite freely, but on examination nothing could be discovered in the ear. In the course of time, however, he became quite deaf, the ear commenced to pain him considerably, attended more or less with a purulent and fetid discharge. Shortly previous to this, he had been to several reputable surgeons and submitted to a thorough examination, but they claimed that no foreign object could be found in the labyrinth of the organ. When the amount of discharge from the ear became diminished in quantity the pain and discomfort became sensibly aggravated, and gradually the sense of hearing on that side became seriously impaired. His wife says that at times he has acted as if he were partially insane, and she noticed that he felt worse when the discharge became diminished in quantity. The pain has continued to be very severe at times, especially after any extra amount of labor or exertion in his daily occupation as a farmer and agriculturist, and, as he describes it, 'crackling sounds were heard in his head.'"

With the exception of this infirmity and the resulting semi-deafness, his general health has been very good. On Monday, the 16th day of January, 1879, he came to my office and requested me to examine his ear and see if nothing could be done for his relief, claiming all the while that he felt as if there were something in his ear. After introducing a silver bivalve speculum in his ear, with the aid of a strong artificial light I discovered a dark hard-looking substance projecting through the internal meatus. With a pair of long narrow-bladed forceps I succeeded in getting hold of the object, and by careful manipulation finally extracted it. There was very little bleeding attending the operation, but a profuse discharge of very offensive purulent matter. The substance extracted was the budded end of a twig a half inch in diameter and one and a half inches long by actual measurement, which was somewhat

flattened on two sides. It consisted of tough, hard, woody fibre with the adherent bark. Mr. Nickels took the substance home with him and unfortunately lost it, so that afterwards I could not obtain it to exhibit as a specimen. He persistently claimed that the substance entered the right ear, while it certainly was extracted from the left ear. I am confident, however, that he certainly must be mistaken in regard to it as the broken end of the twig presented first. It seems almost incredible that this broken piece of a hawthorn twig could have remained in this man's head for over thirty years without giving rise to more serious symptoms; but both his wife and himself at the time persistently attest to the truth of the aforesaid statement.

After the operation he was advised to syringe out the ear with the following lotion, to be used warm:

℞ Acid carbolic, (officinal strength).....gtts xxv
Glycerine,.....3 j
Aquæ fervens,.....3 iv.

His wife stated (a month after the operation) that he had not since complained of severe pain in his head, and that there has been but very little discharge. His hearing, however, has not materially improved, but he certainly has very much gained in general health, and he has not been annoyed with ringing noises in his head as formerly. After the extraction of the twig by the aid of the speculum I could plainly see the drum of the ear had been perforated, hence there was no possibility of his sense of hearing ever becoming improved.

ENDOCARDITIS FOLLOWING CIRCUMCISION.

Czerny (*Prager med. Wochenschr.*, No. 39, 1891) has reported the case of a child of Israelitish parents, that was without antiseptic precautions circumcised on the fourteenth day after birth, and two weeks later presented restlessness, apparent difficulty of breathing, elevation of temperature, and loss of weight. On osculation over the body of the heart systolic and diastolic murmurs were heard, but the organ was not enlarged. The diastolic murmur subsequently disappeared and cardiac hypertrophy developed. Prior to the operation the heart had been auscultated, and no murmurs were heard; so that etiological association between the operation and the endocarditis was quite clear.

Strychnine is used as an antidote for snake bites in Australia.

SELECTED FORMULÆ.

THIOL IN CONSTIPATION.

The following formula has been found useful (*Pharm. Centralb.*) in constipation:

℞ Thiol.....gramme 0.10.
Mica panis.....q. s. ut ft. massa.
Ft. pil. no. x.
Sig. One pill daily.

—*La Médecine Moderne*, Suppl., November 5, 1891, p. 170.

CREOLIN-IODOFORM OINTMENT.

Creolin.....m. xx.
Iodoform.....gr. xl.
Vaseline.....3 i.
S. Make an ointment.

The odor of iodoform is completely masked.
—*Nouveaux Remèdes.*

INFLUENZA.

Prof. Bacelli, of Rome (*Le Bulletin médical*, No. 4, 1892), praises the following formula in the grippe:

℞ Phenacetine, } .....ää cgms. 10.
Salicylate of quinine, }
Camphor, } .....ää mgms. 5.
Kermes mineral, }
Sufficient for one powder. Three or four such powders a day.

PIPERIDZINE.

Piperidzine (*Lo Sperimentale*, No. 21, 1891), the great uric acid solvent, is prescribed as follows:

℞ Piperidzin. pur.....gr inme 1.
Aq. destillat.....grammes 180.
Syrup corticis aurant.....“ 20.
Sufficient for twenty-four hours. The dose may be gradually increased to three grammes (forty-five grains) per day.

For hypodermatic use inject as follows:

℞ Piperidzin. pur.....decigrammes 3-5.
Aq. destillat.....grammes 10.
Inject a Pravaz syringeful every two days. After fourteen days the dose may be increased to ten centigrammes

---

ACUTE BRONCHITIS.

℞ Vini ipecacuanhæ.....3 ij.
Liq. potassii cit.....3 iv.
Tinct. opii camphorat.,
Syrup. acaciæ.....ää 3 j.
M. Sig. A teaspoonful, thrice daily, in the first stage of ordinary bronchitis.

HICCOUGH.

Dr. Whelpley recommends the following:

Subnitrate of bismuth.....grains 45.
Oxide of zinc.....“ 60.
Valerianate of zinc.....“ 60.
Powdered calumba.....“ 60.
Powdered opium.....“ 1½.
Spirit of anise to flavor.
M. The dose is half a teaspoonful in a wine glass of sweetened water.

EARACHE.

An earache cure, recommended by a German medical journal, is made as follows:

℞
Chlorinated camphor.....pints 5.
Glycerin..... " 30.
Oil of sweet almond..... " 10.
Mix and moisten cotton, and place in the ear.

—*Cincinnati Medical News.*

CREOLIN-IODOFORM OINTMENT.

The advantage of this prescription (*Les Nouveaux Remèdes*) is said to be that the smell of the iodoform is well masked.—*Therap. Gazette.*

Creolin.....grains 15.
Iodoform..... " 30.
Vaseline.....drachms 6.
Make into an ointment.

OINTMENT FOR ERYSIPELAS.

Corrosive sublimate .....gr. ss.
Lanolene.....3 v.
Vaseline.....gr. ss.

—*Med. Press and Circular.*

PROPHYLAXIS AND TREATMENT OF MERCURIAL STOMATITIS.

Dr. Feibes (*La Semaine médicale*, No. 57, 1891) regards dentifrice powders and gargles as the best means of preventing mercurial stomatitis during a "course" of mercury. He uses the following powder as a dentifrice:

℞
Cretæ preparat.....grammes 32.
Potass. chlorat.,
Corticis cinchonæ rubræ.....āā " 16.
Ratanhiæ..... " 10.
Sapon. medicat..... " 23.
Essent. menth. piperit..... " 3.

As a gargle he employs:

Alumin. acetat.....grammes 10.
Aq. destillat.,
Aq. flor. aurantior.....āā " 200.

If the gums become sensitive they may be sponged three times a day with:

℞
Tinct. myrrhæ,
Tinct. nuc. gall.,
Tinct. ratanhiæ.....āā grammes 5.

CHILBLAINS.

The following is recommended:

℞
Ol. terebinth.,
Balsam copaiba.....āā ʒ i.
S. Apply to surface when not denuded.

—*Notes on New Remedies.*

DISINFECTANT INTRA-UTERINE INJECTION.

Dr. Ter-Grigoriantz (*La Semaine médicale*, No. 59, 1891) praises the following:

℞
Sublimat. corrosiv.....cgms. 10.
Acid carbolic.....gms. 20.
Acid boric..... " 40.
Acid salicylic..... " 5.
Zinci chlorid..... " 10.
Aq. destillat..... " 2000.

DERMATOL.

In the clinic of Dr. von Rogner, at the Wieden Hospital, Vienna, dermatol has been found efficacious in the treatment of wounds, burns and abscesses. It was used:

1. Pure, as dusting-powder.
2. As ointment:

℞
Dermatoli.....ʒ v.
Vaselin. flav.....ʒ ss.
M. Sig. Ungt.

3. In collodion emulsion:

℞
Dermatoli.....ʒ iij.
Collod.....ʒ iij.
M. Sig. Use locally.

INFLUENZA COLDS.

"Few remedies are more reliable, and act better as a preventive, or lessen the distressing symptoms of an influenza cold, than the following mixture:

℞
Sodii salicylas.....ʒ jss.
Liq. ammon. acet.....ʒ ij.
Aq. camph.....ad ʒ vj.
Misce. Capt., ʒ ss. omnis 3tiis horis.

If this be taken every two or three hours when the first symptoms of cold come on, it will usually ward off the attack."—*British and Colonial Druggist.*

BENZOL IN INFLUENZA.

Robertson (*British Medical Journal*, No. 1621, p. 171) recommends the employment of benzol in the treatment of influenza—and he has likewise found it useful in the treatment of whooping-cough. The symptoms of the disease are speedily and favorably influenced, and pneumonia seems to be prevented. Benzol can be dispensed in capsules or in mixture, in doses of three minims for children and five minims for adults, every two or three hours. The following formula may be employed:

℞
Benzol. pur.....ɱ lxxx.
Spts. vini rect.....f ʒ ss.
Spts. chloroformi.....f ʒ iij.
Mucilag. tragacanth.....ad f ʒ viij.
M. Sig. A dessertspoonful or a tablespoonful as a dose, to be taken in lemonade.

MIXTURE FOR HÆMORRHAGE.

℞
Powdered ergot.....drachms 2½
Sulphuric acid.....minims 30.
Distilled water.....pint 1.
Boil and evaporate to six ounces and then add
Alcohol.....drachms 6.
Syrup of cinnamon.....ounce 1.

—*Pharmaceutische Post*, No. 27, 1891.

GONORRHŒA.

The following (*Lo Sperimentale*, No. 16, 1891) is spoken highly of in gonorrhœa:

℞
Ergotin.....dgms. 3.
Aq. destillat.....gms. 300.
Inject twice a day.

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LEADING ARTICLE.

IODOFORM GAUZE TAMPON IN POST-PARTUM HÆMORRHAGE.

The method of packing the uterus with strips of iodoform gauze for post-partum hæmorrhage, occurring either from atony of or injury to the womb, was originally advanced by Dührssen. Although the previous experiences with the method have been most satisfactory, still objections are very frequently raised: the tampon may in many cases be superfluous, it might easily lead to an infection, and it hinders the contraction of the womb, all of which would seem designed to increase the possibility of hæmorrhage rather than lessen it.

These opposing statements have led Dr. Stæheli, of the Obstetrical and Gynæcological Clinic of Berne, Switzerland, to report his extended experiences with the method. This report first appeared in a recent number of the *Correspondenzblatt für Schweizer Aerzte*, but has also been editorially discussed by the *Medicinische Neuigkeiten*, and elsewhere.

That the method has an indisputable value is evident from the fact that out of 5,424 births occuring at the above named institute since 1880, there have only been nine deaths from hæmorrhage occurring shortly after child-birth.

Out of forty-nine cases in which the tampon was used, a passing elevation of temperature was observed in five cases, and death in one case, owing to sepsis subsequent to Cæsarean section. These results as opposing the objection of possible infection are most favorable in support of the procedure, especially as it must be remembered that the tampon was used in the most severe cases, where frequent manual examinations had not only been undertaken, but where operative procedures had not infrequently been resorted to.

Regarding the third objection raised, viz. that a tampon in the utero-vaginal canal is likely to do more harm than good, the simple fact that in all of the forty-nine cases all hæmorrhage from the genitalia was rapidly

and permanently checked, entirely sets aside this objection. In no case was any hæmorrhage observable after a removal of the tampon, and only a few insignificant clots were ever formed in the meshes of the gauze. These results were obtained in hæmorrhages resulting from atony of the uterus, which had withstood every other available therapeutic means, and also in cases of injury where a suture could not be made, either from the fact that the bleeding point could not be rendered visible, or else because the undertaking of such an operation in the face of so copious a hæmorrhage was out of the question.

Since the adoption of Dührssen's iodoform tampon in obstetrical therapeutics the course of a birth complicated by post-partum hæmorrhage may be described as follows:

A diagnosis as to the source of the hæmorrhage is of primary importance, whether it be from the utero-placental wound, or from a laceration of the vulva, vagina or uterus. The hand of the operator, placed over the uterus from without, can easily distinguish whether that organ is contracted or relaxed, and at the same time if the bladder is full. In the latter case the uterus will be found to be pushed upwards and usually to the right. The bladder should then be quickly emptied by means of a catheter. If the uterus is relaxed it should be rubbed or kneaded. The organ then becomes firm, but if the hæmorrhage continues unabated it is evident that we are dealing with a laceration. If the bleeding only occurs with a relaxed uterus then we are dealing with a hæmorrhage from the utero-placental wound. If the bleeding occurs only in a somewhat less degree when the uterus is contracted, then we have a hæmorrhage resulting from atony complicated by a laceration.

If the laceration can be rendered visible—and in searching for such an injury we should include an inspection of the clitoris region, the hymeneal ring, the perineum, and the vaginal walls—and if the hæmorrhage is not too copious, a wad of absorbent cotton should be pressed against the parts until the afterbirth has come away. Then the lacerated parts should be united with catgut sutures. In other cases where the hæmorrhage is of a very copious character, the lacerated parts should be immediately united with catgut sutures without waiting for the after-birth to be expelled. If the injury cannot be seen, a careful manual examination of the vagina should be made to see if there is any perforation. If there is, a hot douche (45° to 50° C.) of a 1 : 4000 bichloride of mercury solution, will frequently check the hæmorrhage. If the injury does perforate into the vaginal cavity, then, after removal of the after-birth, there remains no other procedure at our disposal than the tampon.

If we are dealing with a uterine atony we should with all speed, either by Credé's method or manually, remove the after-birth and douche the womb with a hot 1:2000 solution of bichloride of mercury (according to Stæheli); the uterus should be rubbed in the meanwhile, and a hypodermatic injection of 1.0 gramme of ergotin given in the thigh. If these means are without avail, we must use the tampon.

In narrow genitalia the cervix must be caught with hooks and brought forward, but when there is plenty of room the procedure is a most simple one. The armamentarium consists of several strips of 30 per cent. iodoform gauze 2½ meters long (about three yards) and 5 centimeters (2 inches) wide. Each strip contains 1.7 grammes of iodoform; further, a tampon of moist salicylated cotton (4 per cent.) about the size of an English walnut for the mouth of the vagina.

After the tampon has been inserted, the operator should not fail to watch the uterus for an hour or so; or else a firm abdominal binder, into the folds of which a sad-iron or other weight has been placed, is applied, so that the weight comes over the fundus, preventing the relaxation of the womb in that direction. In severe cases an ice-bag may be placed over the abdomen, and one-half to one gramme of ergotin (Nienhaus') injected hypodermatically.

The uterine cavity, cervix and the vagina should all be tamponed, so that the possibility of an external and visible hæmorrhage being

merely transformed to an internal one is obviated, which could easily be the case if only the cervix or vagina were packed.

In the usual cases of atony and minor injuries or lacerations, the tampon can be removed the next day. In cases of severe injuries it should be left in place for forty-eight hours. The tampon should never be removed, however, without having another in readiness in case of an emergency. This rule is of the greatest importance, and should be always followed, at least in cases of severe injury.

In cases where more than five or six strips of gauze are necessary for the tampon, a few strips of salicylated gauze can be added advantageously. A mixed tampon of this kind should be practically odorless after having been kept in place for forty-eight hours.

We would raise another point of warning: in hurried packing of the uterus, etc., lacerations of the vulva in the region of the clitoris very easily occur, but can be prevented by due care.

In cases of rupture of the parts, besides a careful packing of fundus, cervix and vagina, the seat of the rupture itself and that part of the pelvis into which it opens must also be packed. Pressure must be maintained by a firm abdominal binder, augmented by cotton packing over the fundus, etc.

In one case of this kind resulting successfully, reported by Stæheli, no less than seventeen strips of gauze were used in completing the tampon.

In a few cases where large quantities of the gauze were used, iodine was traced in the urine. No unpleasant symptoms were ever observed as resulting from its use.

In conclusion, the obstetrician who has in his instrument case the iodoform tampon may rest assured that no woman need bleed to death from a post-partum hæmorrhage while under his care; and even if he be called in after the bleeding has begun, the chances are that he can save the case. After having applied the tampon in a case of atony, he can leave the patient without fearing a secondary hæmorrhage. Again, the tampon is easily applied; there is no need of a skilled assistant; and, finally, the procedure should not be used as a last resort, but be undertaken as soon as it is seen that the usual remedies have failed, and before the patient has suffered seriously from loss of blood.

LITERARY NOTES.

—The *New Albany Medical Herald* has been resurrected.

—The most recent addition to the list of medical journals is *The National Medical Review*, edited by Dr. Chas. H. Stowell, and published monthly in Washington, D. C.

—Mrs. Gladstone's first article in the series of "Hints from a Mother's Life," which she has written for *The Ladies' Home Journal*, will be printed in the April issue of that periodical.

—The first number of a new monthly—*The International Medical Magazine*—has been issued by the J. B. Lippincott Co. It contains some very interesting papers, and will doubtless prove a valuable addition to current medical literature.

BOOK REVIEWS.

A PRACTICAL RESUME OF THE MODERN METHODS EMPLOYED IN THE TREATMENT OF CHRONIC ARTICULAR OSTEITIS OF THE HIP. By CHARLES F. STILLMAN, M. Sc., M. D., Chicago., 118 pages. Price: Paper, 25 cents; cloth, 50 cents. Physicians' Leisure Series: Geo. S. Davis, publisher, Detroit, Mich., 1891.

This work has been compiled by the author with the object of acquainting practitioners and medical students with the most recent views held by orthopœdic writers upon the management of hip disease.

The subject is treated in a clear and concise manner, and apparently, is discussed with entire freedom from personal prejudice.

The individual methods of treating this affection as followed by Drs. H. O. Thomas, De Forest Willard, E. J. Chance, Bernard Barton, E. A. Andrew, Louis, Bauer, C. F. Taylor, L. A. Sayre, N. M. Shaffer, M. J. Roberts, R. W. Lovett, A. B. Judson, A. M. Phelps and W. Blanchard are fully presented, and take precedence to that adopted by the author, with which the volume concludes.

The book is copiously illustrated. The perusal of its contents will amply repay the reader.

DISEASES OF THE HIP-JOINT. FISKE PRIZE FUND DISSERTATION, No. XLII. ROBERT W. LOVETT, M. D. Geo. H. Ellis, Boston, 1891.

This very attractive monograph upon the Etiology, Pathology and Treatment of Diseases of the Hip-joint was awarded the Fiske Prize in 1891. That the award was a just one the readers will be convinced after a careful perusal of the work.

The author first considers Acute Arthritis of the Hip-joint, which he considers a form of that disease which was first described by Mr. Thomas Smith, of London, under the title of Acute Arthritis of Infants. This affection which is a rare one, and one which is often confounded with other diseases, has been very clearly described by Dr. Lovett.

The author also describes acute synovitis and chronic serous synovitis of the hip-joint, and treats these subjects in such a manner that a careful study of his work will do much to correct the error which is often made of classing these cases with the disease we recognize as tuberculous osteitis or hip disease. The subject of tuberculous osteitis of the hip-joint is treated in a masterly manner, and the author's views upon the etiology, pathology and treatment of this affection are fully up to the times.

Dr. Lovett believes that the best results are obtained in this affection by constitutional and mechanical treatment, and is not in favor of early operative procedures, reserving excision of the hip-joint for those cases which have passed beyond the point where mechanical treatment can be applied with advantage, or for those in which it is practised as a life-saving measure. We confess that we have been disappointed in the ultimate results of excision of the hip-joint in many cases, and agree with the author that the results, as a whole, are not as satisfactory as those obtained by mechanical treatment. The author describes many forms of splints and apparatus employed in the treatment of this affection, and shows their application in many cases by means of excellent illustrations.

The work also contains articles upon Gummatous Osteitis, Arthritis Deformans, Charcot's Disease and Malignant Tumors of the Hip, and an excellent paper upon Congenital Dislocations of the Hip-joint.

It has seldom been our fortune to receive a work which shows such careful study of the subject matter treated, and which contains so much valuable information, and we most sincerely congratulate Dr. Lovett upon its authorship. The book is gotten up in a most attractive form, and the numerous photographic illustrations add much to its attractiveness.

THERAPEUTICS.

OLIVE OIL IN LARGE DOSES IN ILEUS.

Dr. Mitchell (*La Sémaine médicale*, No. 51, 1891) has used large doses of olive oil with success in the treatment of eight cases of intestinal obstruction. Seventy grammes (2⅓) of oil are taken every two hours, or even more frequently. One patient took 500 grammes (16 ʒ) during one night, another a litre (a quart) in a few hours. An improvement took place in from three to twenty-four hours.

CONVULSIONS TREATED BY COMPRESSION OF THE CAROTID.

Dr. Leopold Roheim, of Budapest, publishes in the *Gyógyászat* a case of eclampsia which he had, after the failure of all ordinary remedies, successfully treated by compression of the carotid. The case, which is quoted by the *Pester Medicinisch-Chirurgische Presse*, was that of a robust man of fifty-six, who had been suffering for years from cancer of the bladder, with occasional hæmaturia. The man had been attacked by a most violent eclamptic paroxysm, which was mainly confined to the left side. Dr. Roheim prescribed in vain musk, valerianate of zinc, bromide of potassium, asafœtida, hypodermic injections of morphia, enemata of hydrate of choral, and frictions with mustard, and at last employed compression of the carotid. After constant compression for some time of the right carotid the convulsions were suddenly arrested, the patient recovered normal respiration, and very soon felt quite well. Two or three slighter attacks followed, which were soon arrested by properly instructed attendants. The effect of the compression was so remarkable that Dr. Roheim earnestly recommends this treatment. He compressed the carotid with the index and second finger between the larynx and sterno-cleido-mastoid muscle backwards towards the spine, just as Trousseau and Blaud had recommended. He was equally successful in the case of a girl nine years old. He considers the *rationale* of the treatment to be that by compressing the carotid and at the same time necessarily the sympathetic nerve fibres, which closely follow the course of the artery, the excitability of the brain is allayed.—*Lancet.*

THE TREATMENT OF PLEURITIC EXUDATIONS BY MASSAGE.

Dr. P. Poliakow reports 10 cases of primary pleuritic exudations, 7 serous and 3 serofibrinous, which were benefited by massage of the affected half of the thorax. The massage is conducted in the direction of the lymphatics, the strokes all converging toward the axillary space. The rubbings at first are slight, but must later be energetic. The sittings are daily, and last from 10 to 20 minutes. By this treatment exudations disappeared in from 8 to 20 days, whereas, the other symptoms of the disease lasted from 9 to 35 days longer. The action of massage of the thorax is that of a counter-irritant, which can be applied daily. The massage also relieves the thoracic pain, and increases the strength of the muscles, thus rendering the amplitude of thoracic movement greater, a condition which beneficially influences the absorption of the exudation and dilatation of the compressed lung.—*Wiener Med. Presse.*

THERAPEUSIS OF SYPHILIS.

Ehrmann (*Centrabl. f. die ges. Ther.*, December, 1891) gives a review of the more recent methods of treating syphilis. The efficiency of mercurial inunction depends among other things on the number of the follicles in the skin, and no greater effect is obtained by rubbing in a larger quantity of the ointment, unless over a greater extent of skin surface. Mercurial injections in exact dosage have the advantage of not depending on the patient for being carried out, and of the distinction of the general from the local effects. The disadvantages in using soluble mercurial salts for injection are that they pass through the body rapidly, and that they produce toxic effects more easily. The remains of the syphilitic poison are still present, and it may multiply so as to give rise to relapses. With inunction as well as with the injection of insoluble preparations a depot of mercury is left which is gradually absorbed. According to Lichtenstein, relapses are more frequent after the injection of partially soluble preparations such as the salicylate of mercury than after the more insoluble such as the oleum cinereum. With the latter the injection is made weekly, whereas with soluble preparations it must be made daily, and thus one advantage over inunction is lost. Great care must be taken in cleaning the needle. As to the duration of treatment the limit is generally put down as three years, but it cannot be named for all cases. The author mentions two years. If after two years a relapse occurs (a rare event in the author's experience) or marriage be thought of, an extra year must be thrown in. The object is to avoid rather than to treat relapses. If a relapse occur within a few weeks after the discontinuance of the first treatment (by injection or inunction) one may be obliged to give mercury internally. At the end of three months, whether relapse or not, pills of the protiodide are given. After 6 months the patient gets seven injections of oleum cinereum at intervals of from 5 to 8 days, or 20 to 25 inunctions. This is repeated at the end of the first year. If there is a relapse in the first half year—and this must always be treated—mercury is given at the end of the third quarter. In the second year the inunctions or injections are repeated twice. If internal treatment is adopted, seventy-five pills of the protiodide correspond to some four injections. Mercury taken by the mouth and absorbed into the portal circulation may be excreted with the bile, and thus the full effect is not obtained. The treatment inaugurated by Fournier is a considerable advance; and though it is not time yet for a statistical statement, nevertheless it is certainly known that hereditary syphilis and severe and early relapses are decidedly diminishing.—*Brit. Med. Jour.*

MASSAGE OF THE PROSTATE.

Dr. Eberman presents the following conclusions as to the value of massage in prostatic disease: 1. It can be advised (*a*) at the decline of an acute parenchymatous inflammation where there remains difficulty in urination, the gland being still slightly swollen, and but little painful; (*b*) when the acute or chronic inflammation terminates in abscess, the massage having for its object the evacuation of the pus, and the resorption of the engorgement still present; (*c*) in cases of chronic parenchymatous inflammation with swelling; (*a*) in soft hypertrophy with uniform consistence of the gland. 2. Partial hard myomatous hypertrophy of the gland is not susceptible of massage; however, the massage in this case does no harm, and it can be tried, first introducing a pewter bougie into the urethra. Perhaps if the resorption of the tumor is not effected, the urethra, which has been modified by the irregularities of the hypertrophied prostate, may be again restored to proper calibre. The middle lobe of the hypertrophied prostate encroaches upon the cavity of the bladder, and by reason of its situation cannot be subjected to massage.—*Wratch.*

MEDICINE.

INTESTINAL OBSTRUCTION BY A MASS OF ROUND WORMS.

Dr. Heydenreich reports a case of intestinal obstruction, in which the Nélaton's operation was performed in the left groin with successful results, and the artificial anus was afterwards completely and permanently closed by a novel autoplastic operation. The subject, a child 11 years of age, came under the notice of the author on the ninth day of a severe attack of obstruction. The case having been diagnosed as one of intussusception, the idea of performing laparotomy was not entertained, as it was thought that the adhesions between the layers of intestines would be too firm to permit of the invaginated portion being drawn out. The small intestine was opened in the left groin, and two days later a bulky mass, made up of seven round worms, presented itself at the artificial anus, and was extracted. The young patient quickly recovered from the attack of obstruction, and the artificial anus was subsequently closed. Blood was passed from the anus during the period of obstruction.—*British Medical Journal.*

PATHOGENESIS AND TREATMENT OF SCOLIOSIS.

Dr. L. H. Petit, of Paris, according to the *Mercredi Médicale*, September 30, 1891, thinks that scoliosis is due to some vice of nutrition that acts at the same time upon the three elements of articulation—upon the bones, ligaments, and muscles—beginning in arrest of development in some point of ossification in the body of the vertebræ. The primary cause of this condition is not rachitis. Subjects attacked with scoliosis are usually lithæmics, neuropathics. Among them, neurasthenia makes itself felt in all the joints, which show a generalized relaxation. If the spinal column seems to suffer oftener from deformity, it is simply because such an important deviation cannot possibly be overlooked. To lithæmia and neurasthenia is frequently joined mental overwork, bad habits of poise while studying or during play. Growth and the establishment of puberty are also a tax. Dilatation of the stomach is of frequent occurrence among lithæmics, neurasthenics, and those suffering from scoliosis. In itself, it is a potent cause of debility. Treatment, exclusive of local or mechanical measures, consists in remedying, as far as possible, this dilatation, the lithæmic state, the neurasthenia, and menstrual disturbances.

WOOLSORTER'S DISEASE.

In the *Arch. de Méd. Expérimentale*, August, 1891, S. Lodge gives an account of broncho-pulmonary charbon with five cases. In a short historical sketch attention is drawn to the diminution of the disease since 1884, when precautionary measures were enforced. A few cases are still seen, owing to the occupation sometimes being carried on in private and with neglect of precautions. The smell and irritant properties of the dust are well recognized. The following are among the symptoms: *Malaise*, bodily fatigue and somnolence, coryza and lachrymation, cough, at first dry then with expectoration containing anthrax bacilli, and difficulty in taking a deep breath. Palpitation, nausea, and vomiting may be present, and the author looks upon a feeling of constriction at the base of the chest as pathognomonic. Physical examination reveals a bilateral pleurisy with moderate effusion and also foci of broncho-pneumonia. The urine contains albumen and sometimes even sugar. The temperature is never above normal. When fatal, the disease lasts about six days. If the patient's occupation be unknown the diagnosis may be difficult. The prognosis should be cautious. Attention is drawn in the morbid anatomy to œdema in the tissues of the neck and mediastinum. There is fluid in the pleural and pericardial sacs. Besides injection of the bronchial mucous membrane there are elevations of a deep red color. The organisms are mostly found in the submucous tissue and also in the broncho-pneumonic foci. The spleen is usually normal in size. Prophylactic measures consist in ventilation and burning the dust collected in the ventilators, in the disinfection of hands, and the use of special clothes. Eating in the workshop is forbidden. The diseased wool should also be disinfected by super-heated steam—a point not enjoined in the regulations.—*Brit. Med. Jour.*

OSSIFYING MYOSITIS.

Macdonald (*British Medical Journal*, August 29, 1891) reports the case of a girl, four years old, in whom at two years of age hard nodules developed in numerous muscles of the head, neck, upper extremities, and trunk, occasioning rigidity and interfering with the movements of the affected parts. No hereditary factors could be elicited. Treatment was of no avail. Portions of the indurated parts removed were constituted of bone, having fibrous attachments of origin and insertion.

SURGERY.

THE EXCISION OF CARBUNCLES.

Wölfler (*Centralblatt für Chirurgie*, No. 40, 1891) writes as follows: The slow healing of carbuncles after treatment by the usual method of deep incisions, the gangrene of the skin, and the danger of renewed infection of the adjacent parts, as well as the formation of a frequently disfiguring cicatrix, induced Riedel, since 1883, to excise at once in all cases. For this purpose a circular incision is made around the infiltrated parts. This is followed by radiating incisions, starting from the periphery of the previous one, and perpendicular to it, in the direction of the sound tissue. The carbuncle itself is not incised. In this way, at least four skin-flaps are formed. These are cleared of inflammatory products. Once beyond the area of infiltration, the knife must be carried down to the fascia of the muscles and the whole of the morbid tissue removed, to bring the operation to an end. There is frequently very free bleeding, which is arrested by pressure and plugging. On the evening following the operation, the temperature tends to become normal; on the following day, the skin-flaps are brought nearer together. The central solution of continuity allows escape of secretions. Riedel praises this method for the following reasons: 1. A harmless loss of skin and subcutaneous tissue gets rid of a dangerous focus of inflammation. 2. The excision brings the local morbid processes to an end at once, and, consequently, all danger of general infection is removed. 3. The loss of sound tissue is small. 4. The healing is rapid. 5. The cicatrix is good.—*The Provincial Medical Journal*, December 1, 1891, p. 751.

INTRAPERITONEAL HÆMORRHAGES

Dr. Veit (Volkmann's *Samml. Klin. Vortr.*) discusses the question, why in some cases these hæmorrhages are arrested spontaneously, while in others this does not happen, and death ensues. The most frequent cause of intraperitoneal hæmorrhage is ruptured tubal pregnancy. The author's experience demonstrates that coagulation of blood takes place in the abdominal cavity, but more slowly than in other parts of the body. The action of pressure in arresting the bleeding cannot be relied upon, owing to the absence of counter-pressure in the abdominal cavity. The conditions for effective contraction of the uterus are also wanting in tubal pregnancy. It follows, therefore, that unless adhesions exist which limit the effusion of blood and lead to formation of an hæmatocele, the hæmorrhage will not be spontaneously arrested. If it takes place in a previously healthy abdominal cavity, the case usually terminates fatally. In laparotomies for intraperitoneal hæmorrhage, elevation of the pelvis is of great advantage for controlling the hæmorrhage; ligation of the bleeding vessels, as well as the uterine and spermatic arteries is also required.

THE ENLARGED PROSTATE AND ITS OPERATIVE RELIEF.

Keyes contributes a valuable paper on this subject in the *New York Medical Review*, Oct. 31, 1891. Eleven cases are submitted. In case one, through a perineal incision, a phosphatic stone was removed, and a small third lobe twisted off. Voluntary urination returned and remained for several years. Case two, aged sixty-five. Perineal incision, an outstanding section of the right lobe was twisted off, with much relief, but not complete cure. Case three, aged sixty-six. Perineal incision, middle lobe incised in V-shape and twisted away; cured. Case four, aged sixty-five. Suprapubic section, small projecting lateral growth removed, and urethral opening scraped as free as possible; cured. Case five, aged seventy. Clear urine, no albumen or pus, suprapubic operation, middle lobe pinched off with the rongeur; death from suppression of urine. Case six, aged sixty-six. Suprapubic, prostate around urethra cut and scraped away; cured. Case seven, aged fifty-nine. Suprapubic, large stone and third lobe removed with snare; cured. Case eight, aged sixty-six. Small stones and third lobe removed; good recovery. Case nine, aged sixty-five. Horse-collar enlargement with third lobe removed with scissors and rongeur; good recovery. Case ten, aged sixty. Also suprapubic, small calculus and prostatic bar removed; patient improving. Case eleven, aged sixty-one. Stone removed and also part of prostate gland; sank and died on the fifteenth day. This was a serious case from the start. The following conclusions were presented: (1) Prostatectomy is justifiable, and does what nothing else can. (2) The perineal operation is moderately less severe, but decidedly less reliable than the suprapubic; it should rarely be preferred, unless there be urethral complications. In very feeble men it may still be elected. (3) The operation is not justifiable with present statistics if the patient can be comfortable in catheter life. (4) No physical condition of the patient, short of a practically moribund

state contra-indicates operation. By it, in desperate cases, life is often actually saved, although the operation is a grave one and its mortality high. (5) With the rongeur, better than any instrument, the bladder outlet can be lowered, and polypoid or interstitial growths jutting into the prostatic sinus can be removed, and these points are more essential to a successful operation than is the taking away of a large portion of the prostatic bulk. The instrument next in value is the curved scissors, but the skilled finger is the most important of all. Most of the work has to be done by the aid of touch, as the bleeding soon becomes free and renders visual inspection impossible. Diuretin, perhaps, is of value when the kidneys are damaged. It certainly does no harm. (6) Chloroform alone, in my opinion, should be used as an anæsthetic for the kidney's sake. —*Univ. Med. Mag.*

OBSTETRICS.

TRILOBED PLACENTA.

Tarnier (*Journal des Sages-Femmes*, October 1st, 1891) exhibited before his class a placenta of this kind from an ordinary labor. It consisted of three lobes of considerable size, not of one main placenta with two placentæ succenturiatæ. The cord, contrary to rule, was inserted into the largest of the lobes, and the vessels ran thence to the middle and smallest lobes. On closer inspection the vessels were seen to run from lobe to lobe across the tracks of membrane which separated them. A similar condition is seen in velamentous insertion of the cord where the vessels run first over the membranes before they reach the placenta. This trilobed placenta was of no pathological importance in the particular case where it occurred, but an anomaly of the same kind might prove very serious in other cases, especially as regards the danger of leaving a lobe behind in the uterus.—*Brit. Med. Jour.*

THE TREATMENT OF ABORTION.

The question of the rational treatment of abortion is still undecided, and Dr. Chazan considers that evil results are often due to the too exclusive spirit of the partisans of both methods. In cases of threatened abortion all agree that it is necessary to combat uterine contraction by rest, opiates and every means in our power; but when the death of the fetus has already taken place, and pain and hæmorrhage are present, some authors endorse immediate delivery, while others think the presence of a dead fetus in a closed uterus absolutely inoffensive, and rely upon the expectant method, unless active interference is positively indicated. Opinions as to the treatment of those cases in which the abortion is still in progress are quite as diverse; but Dr. Chazan would divide these patients into two classes—those who have pain without hæmorrhage, and those who have hæmorrhage with or without pain. The former class may be treated safely by the expectant method; and even when hæmorrhage is present, immediate evacuation of the uterus is not always indispensable, and is sometimes impossible on account of the absence of assistants and instruments. The tampon may then be found to fulfil all indications. It may not only arrest hæmorrhage, but on taking it away, all the membranes are often found in the enlarged cervical canal. Contrary to the opinion of Dührssen, the expulsion of the entre placenta is the rule and not the exception. But the tampon, in order to achieve this end, must fulfil the following conditions: Its asepsis must be perfect; it must arrest hæmorrhage and strengthen the pains. The first is easily attained by bathing the genitals and vagina with an antiseptic solution, and making the tampon of iodoform gauze, or cotton dipped in a 3 per cent. solution of carbolic acid. In multiparæ the tampon may not always arrest hæmorrhage, and we may then have recourse to the intra-cervical tampon, which is generally more efficacious than the colpeurynter. First fill the posterior *cul-de-sac*, and then the cervix. Tampons made of cotton must not be left in place more than 5 or 6 hours. When hæmorrhage continues after the abortion, the expectant treatment can lead to no result; but the decision as to when and how to interfere must depend upon the general state of the patient and the condition of the contents of the uterus.—*Gazette de Gynécologie*, November 1, 1891.

PROLAPSE OF PREGNANT UTERUS: "EXTRA-ABDOMINAL DELIVERY" AT TERM.

F. Stein (*Wein. Med. Blätter*, December 3d, 1891) was called in to a woman already several hours in labor. The midwives declared that labor was impeded by a great tumor growing from the vulva. The patient was a weakly dwarfish woman, about 25 years of age. She had already borne a child. Stein discovered a round mass as big as a child's head, which had descended out of the pelvis with its contents. The os was dilated, and the child's occiput presented. In front the greater part of the uterus, except the

fundus, has been forced out of the pelvis by the pains. At the end of two hours the child was delivered, slipping out of the uterus as though from a sac. The pains had been strong and regular throughout. All Stein could do was to support the uterus during the pains, lest it should protrude further or tear off from some of the important structures which serve as its ligaments. The child was well developed and living; it was born at term. The uterus was carefully replaced, with antiseptic precautions, after delivery. No evidence of malformed pelvis could be detected, the measurements being normal. After recovery the patient was able to return to work, a suitable pessary having been applied. Stein observes that it was most instructive to watch the progressive dilatation, gradual thinning, and ultimate effacement of the os as the pains progressed.—*Brit. Med. Jour.*

ACUTE OÖPHORITIS COMPLICATING PREGNANCY.

Three cases of this unusual condition are described by Coe (*American Gynecological Journal*, 1891, No. 9). In one, an exacerbation of a chronic oöphoritis followed overheating and sudden exposure to cold. Recovery ensued without the interruption of pregnancy.

In the second case, septic infection followed abortion, and a second pregnancy supervened. Ovarian abscess was diagnosticated, and stimulants were freely administered. A large quantity of pus appeared in the urine, although there was no evidence of cystitis. The patient's pain and temperature subsided. After gaining for some time, fever and sweats again appeared, when labor was induced. After the termination of pregnancy, the patient progressed steadily toward recovery, and ultimately became perfectly well.

The third patient was a multipara, who had had pelvic inflammation; at seven months of her pregnency she had a chill and fever, with pain over the right ovary. She recovered from this, and was well until her confinement. The third day after labor she had a chill and fever, and complained of pain in her right side. After intervals of gaining and losing, ovarian abscess was diagnosticated, and an incision was made over a mass in the pelvis. The diagnosis was correct, and the tube and ovary of one side were removed. The patient was much better afterward. Recovery followed in four weeks after the operation.

In writing of treatment, Coe advises a largely expectant method. Constipation is to be avoided, and hot applications may be used over the area of pain. Abdominal section is most successful when performed before the fifth month.

GYNÆCOLOGY.

PAPILLARY CYSTOMATA OF THE OVARY.

J. W. Williams, (*Bull, of Johns Hopkins' Hosp.*, December, 1891) disagrees with those authorities who trace this disease to Wolffian elements. Papillomata arise, he believes, in the Graafian follicles, in the germinal epithelium, or from ingrowths of the epithelium of the Fallopian tube into the stroma of the ovary, but this mode of origin is, in his opinion, not yet absolutely proven.—*Brit. Med. Jour.*

ENDOMETRITIS AND ACUTE INFECTIOUS DISEASES.

Massin (*Archiv. f. Gynak.*, vol. xl Part 1, 1891) examined the uterus in twelve cases of relapsing fever, two of pneumonia crouposa, two of typhoid fever, one of dysentery, and one of acute diffused peritonitis of uncertain origin. Not only was inflammation of the endometrium discovered, but the inflammatory process extended to the muscular tissue. There were hæmorrhages in the endometrium, very extensive in the cases of continued fever and mixed infection. Massin lays great stress on the fact, shown by his researches, that the uterus is actively involved in acute infectious diseases.

PELVIC MASSAGE.

Dührssen (*Berliner klin.. Wochenschrift*, 1891, Nos. 44, 45, and 46) thus concludes an elaborate paper on Thure Brandt's method, in which he gives a detailed account of the treatment of eighteen cases: If endometritis is absent, the thorough application of massage will stretch or separate bands or adhesions. Organs which are fixed may be more quickly rendered movable by Schultze's method, practised under narcosis; massage should be employed subsequently in order to prevent the formation of fresh adhesions. Laparotomy is no longer justifiable in cases of retroflexion with fixation and chronic oöphoritis and peri-oöphoritis until massage has been thoroughly tried, provided that the trouble is not of gonorrhœal origin. Systematic elevation of the uterus is often sufficient to cure retroflexion. Parametric exudations which were formerly purulent foci are unsuitable for massage; ordinary exudations are generally quickly absorbed.

A NEW METHOD OF HYSTEROPEXIE.

Matlakowski (*Der Frauenarzt*, Hft. 9, 1891) recommends the following method, which he performed with success in three cases: A short incision is made in the linea alba one to two centimetres above the symphysis. The hand is introduced into the abdomen and the uterus raised. The round ligaments are then exposed on each side. Their peripheral portions are ligated and they are cut at about the distance of six centimetres from the uterus and the central end is grasped with a pair of forceps. The peritoneum, fascia, and recti muscles are perforated one to two centimetres to the side of the first incision, and the central portion of the ligaments drawn through these openings, the uterus being held in position; they are fastened to the anterior abdominal wall under the skin by a ligature. The primary incision is then closed and the operation is thus completed.

A CASE OF PUERPERAL PERITONITIS TREATED BY AMPUTATION OF THE UTERUS: RECOVERY.

Dr. A. Lapthorn Smith has reported in the *American Journal of Obstetrics*, January, 1892, the following interesting case: A woman delivered for the second time had an adherent placenta, which was removed piecemeal, with great difficulty, in the twelve hours succeeding delivery, partly by a midwife, partly by Dr. Smith. Forty hours later there was a chill, followed by high fever, although antiseptic injections had been used. Two days after labor a general peritonitis apparently developed. No attempt was made to further clean out the uterine cavity, but the abdomen was opened on the following day, and no evidence of peritonitis discovered. The uterus, as the seat of infection, was then removed, by the extraperitoneal plan, with pins and a nœud. In conclusion Dr. Smith advises:

(1) The temperature should be taken every day after every confinement, and, on the slightest rise, vaginal douches of permanganate solution should be commenced.

(2) If the temperature continues to rise, the douches should be made intrauterine.

(3) If there is no improvement at the end of twenty-four hours, scrape out the uterus with the finger or with the curette, apply strong tincture of iodine, wash out the uterus, and drain with iodoform gauze.

(4) If the case proceeds from bad to worse, and peritonitis sets in, perform exploratory incision, and if no other evident cause can be found remove the uterus.—*Univ. Med. Mag.*

ETIOLOGY AND THERAPY OF WEAK LABOR PAINS IN OLD PRIMIPARÆ.

Borner (*Der Frauenarzt*, Hft, 9, 1891) attributes the weak labor pains so often observed in old primiparæ to a beginning retrograde metamorphosis of the entire generative system. Absolute absence of pains in old primiparæ is to be considered the first indication of the approaching climacteric. The uterus of an old primipara has not the activity or physiological strength of one that has borne children. This the author considers the cause of tardy labors in these cases, and the reason why there is so much risk to both mother and child, requiring careful watching on the part of the physician, and often the use of forceps, turning, sometimes even perforation, or incisions into the portio vaginalis in cases where the os does not dilate sufficiently.

PÆDIATRICS.

THE NON-IDENTITY OF DIPHTHERIA AND THE SCARLET-FEVER DIPHTHERIA.

Heubner (*Jahrbuch für Kinderheilkunde*, xxxi., 1890, p. 56) maintains that there is a distinct difference between primary diphtheria and the diphtheria which occurs in connection with scarlet fever. In five cases of the latter disease he could not once find Loeffler's bacillus, which is generally regarded as the cause of primary diphtheria, while in cases of primary diphtheria he never failed to find the bacillus. Likewise, Kolisko and Paltauf did not find the Loeffler bacillus in cases of angina from diphtheritic scarlet fever.

As further proof that the two diseases are distinct he makes the following statements: In scarlet-fever diphtheria the tissue necrosis is not so marked as in primary diphtheria. Necrosis, and scarlet-fever diphtheria which begins with it, develop from the scarlet-fever angina in the latter part of the first week, and become clinically evident by the symptoms of septic infection, especially by swelling of the lymphatic glands, and by the course of the temperature; the gradual fall of the temperature from the fourth day does not take place, or the temperature again rises when necrosis develops. Moreover, scarlet-fever diphtheria, unlike primary diphtheria, very seldom results in laryngeal stenosis and diphtheritic paralysis.

A CASE OF SECOND ATTACK OF WHOOPING-COUGH.

The possibility of second attacks of pertussis is denied by Rillet, Barthez, and Bergeron. Westen, however, has recorded one case, Trousseau two, and Roger five. The most recent instance is contributed by Legendre (*Rev. mens. des Mal. de l' Enfance*, November, 1891), and constitutes the ninth case of the kind recorded. The patient was a young woman of twenty-five years, who had had pertussis at the age of ten years, at the same time that a sister and brother were affected. Fifteen years later the patient was brought to the author for a cough, which was regarded with suspicion because of the existence of tubercular disease of the lungs in several members of her family. Careful examination revealed no tubercular lesions; and the diagnosis was not made clear until, during a visit of the physician, the patient gave a most characteristic "kink." The girl was then found to have contracted this second attack from a child in the house suffering from severe whooping-cough.

ACUTE RHEUMATISM IN CHILDREN.

A. A. Kisel (*Med. Obozerenïë*, No. 20, 1891) reviews a series of 38 cases of acute articular rheumatism observed in patients aged from 2 to 16. Not more than 16 out of the 38 patients complained of pain about joints; in the remaining cases some other symptoms (most frequently referable to the vascular system) were predominant. The author lays down the following general propositions: (1) Heredity plays a very important part in the causation of rheumatism in childhood. A careful inquiry into family antecedents rarely fails to elicit the fact that the child's parents are rheumatic subjects. (2) In children the course of rheumatism very seldom resembles that of an acute infectious disease. (3) Infantile rheumatism very commonly runs a latent course. (4) Cardiac complications occur more frequently, and are of a more severe type in children than in adults.—*Brit. Med. Jour.*

PURULENT VULVO-VAGINITIS IN LITTLE GIRLS.

Chaumier (*Poitu Medical*, October, 1891) calls attention to the purulent vulvo-vaginitis of little girls, which, according to certain authors, owes its origin to blennorrhagic infection. The writer holds that the disease may also be due to other causes, notwithstanding the presence in the discharge of the gonococcus of Neisser. The disorder is contagious, and is of more frequent occurrence in large cities than in the country. It always exhibits the same aspect, characterized by a thick purulent discharge, agglutination of the great lips, and retraction of the vulva and vagina, but without complicating the urethral canal. Vulvo-vaginitis is often accompanied with a slight feverish reaction, loss of appetite, frequent and painful urination, the pain being due solely to the passage of the liquid over inflamed parts. In a case related by the author the disease was complicated by an arthritis of the knee-joint. If the malady is left to itself it may last a long time, but under proper treatment it will generally yield in from two to two and a half months. The treatment consists in the external applications of lotions and in the vaginal injections of corrosive sublimate.

HYGIENE.

PHYSIOLOGICAL RELATION OF ALCOHOL TO FOOD.

Dr. W. H. Porter (*Med Record*) says: Three classes of proximate principles are necessary to maintain life, and must be supplied as food-stuffs.

That the term food-stuff should be limited to those substances which contain at least one element from each of these three classes in its composition, viz,, an inorganic, a CHO, and a CHNOS element.

That the first act mechanically, the second as non-nutritive stimulants, and the third as true nutritive elements which enter into the essential construction of all the tissues and glands of the body.

That the use of the second class or CHO compounds—including alcohol—when taken in excess of the absolute demands of nature, all tend to overtax the oxygenating capacity of the system and prevent a complete oxidation of the proteids or CHNOS bodies.

That this continued over-stimulation and the half-starved condition arising through this excessive use of the CHO or non-nutritive and alcohol-forming compound, tend most decidedly to weaken the vital forces, develop diseased conditions, and create the habit on the part of the system to take to alcoholic stimulation.

That alcohol *per se* is no more poisonous than fat, sugar, and starch, but they are all factors in depriving the system of its full quota of oxygen to act upon the proteids, and from this incomplete transformation of the latter or CHNOS elements, nutrition is impaired and an almost unlimited number of toxic bodies produced.

That alcohol and the chemical elements which enter into its atomic construction, and the transformation they undergo in passing through the system, and the final products eliminated from the body, are practically the same as follow upon the introduction of fat, sugar and starch.

That alcohol should only be classed as a medicinal agent, and never be used in health as a common article of food.

That to combat most satisfactorily and successfully the alcoholic habit, the proteids or CHNOS food-elements should be the principal substances used, and the CHO compounds of all kinds should be avoided as much as possible.

That there is a common tendency to feed improperly the animal economy from infancy to the grave, and to this false habit all the ills of the human race are largely traceable, and in it we find the chief factor in producing and maintaining the alcoholic habit.

DUST AND DUSTINGS.

"It is our littleness that sees no greatness in a trifle." This is true if success is a multiple of careful details. It is true, therefore, of perfection in every art and work, even the commonest, and among such a contemporary has assigned a place to the seemingly menial art of dusting. For, as he says truly enough, there is an art in dusting, and it is one which on every ground deserves far more studious cultivation than it usually receives. Different observers have from time to time described the components of ordinary dust, and these, it is needless to say, exhibit special characters in almost endless variety. Mineral matters, animal and vegetable débris, morbid germs—whatever, in fact, is light enough and small enough to remain for a time suspended in air, come under this common and generic but far from harmless term. The spread of cholera and exanthematous diseases has, no doubt with perfect truth, been attributed to its influence. It is clear, then, that the method to be employed for its removal is a matter of some importance. As regards this, we need hardly discuss every suggestion of housewifery. Some would pin their faith, not without reason, to the damp duster rather than the dry one, but this will not suffice in itself, and, moreover, every kind of furniture does not bear such treatment. Where possible, of course, it is of the two the more effectual plan. Above all, however, it is needful to remember that the object aimed at is not displacement of dust only, but its removal, and for this purpose a combination of thorough daily ventilation by open doors and windows, with careful sweeping, followed by at least displacement of any dust still remaining with a cloth, is the only method alike feasible and effective. All over-crowding with furniture or with woven fabrics is to be avoided. Bed curtains and valances are no less objectionable, and bare floors are more wholesome than the choicest carpet. Nowhere is care in these particulers more justified or more imperative than in the crowded homes of the poor. Let us but mention one other point—the healthy effect of sunlight. It is now admitted that some disease germs lose their power on exposure to light. In this fact we have a standing protest against the custom of darkening rooms with lowered blinds, or that æsthetic error which covers the window space with crossed curtains.—*Lancet.*

AN ATTEMPT TO RENDER TOBACCO HARMLESS.

Smokers may be pleased to learn that Dr. Gautrelet, of Vinchy, claims to have discovered a method of rendering tobacco harmless to mouth, heart and nerves, without detriment to its aroma. According to him, a piece of cotton wool steeped in a solution (five to ten per cent.) of pyrogallic acid, inserted in the pipe or cigar-holder, will neutralize any possible effects of the nicotine. In this way not only may the generally admitted evils of smoking be prevented, but cirrhosis of the liver, which in Dr. Gautrelet's experience is sometimes caused by tobacco, and such lighter penalties of over-indulgence as headache and furring of the tongue, may be avoided. Citric acid, which was recommended by Vigier for the same purpose, has the serious disadvantage of spoiling the taste of the tobacco.—*Science.*

SAFE QUININE.

(LEVI.)

The troublesome buzzing of the head which follows the administration of large doses of quinine is stated by Dr. Levi, a Central American physician, to be averted by the following combination:

Quinine sulphate	gr. lx.
Pepsin	" lx.
Capsicum	" vj.
Ginger	" xij.
Sodium bicarbonate	" lx.

Mix, and divide into twelve powders.

One of these powders is the dose for neuralgia, but more or less of the combination may be taken according to the nature of the disease. In rare cases quinine causes vomiting and purging symptoms, which are averted, says the *Satellite*, by Dr. Levi's prescription.

MEDICAL CHEMISTRY.

THE ANALYSIS OF RUSSIAN BREAD.

According to *Reuter*, the Russian papers of last Monday published the official analysis of the adulterated flour recently bought by the Municipality of St. Petersburg city. The result would appear to show that it was not adulterated to such an extent as the *Novoe Vremya* announced some days ago. While this statement appears in a negative form, yet the fact that it is qualified by the sentence "to such an extent" does obviously indicate a certain amount of adulteration. The exact details of an analysis of Russian bread carried out in our laboratory appeared in our columns last week, and the results showed an adulteration, even in this specimen which was regarded as unusually good, equal to the addition of ten pounds of foreign substances to every hundredweight of flour. Our report was read with very general interest, inasmuch as it demonstrated distinctly that the flour had been tampered with, not, perhaps, to an excessive extent, as has been believed, but still to an extent which is both unpardonable and unjustifiable. In respect to the results, it is so far satisfactory to learn that our report is practically confirmed by the Russian official analysis, although the *Novoe Vremya* maintains that the official analysis is misleading, and it cites the opinion of several experts in support of this contention.—*Lancet.*

DETECTION OF MORPHINE IN THE URINE.

A paper by Professor Theodore G. Wormley, of the Pennsylvania University, on the recovery of absorbed morphine from the urine, the blood, and the tissues, has recently appeared in the *Chemical News*. The paper, which appeared in several issues, is much too long to attempt to abstract, but the gist of it is given in the following general considerations: In the use of amyl alcohol for the extraction of morphine from the urine, the urea taken up with the morphine interferes more or less with the purification of the alkaloid. In a residue consisting of a mixture of this kind, the urea, as such, may, as we have found, be decomposed by heating the mixture in an air oven for a few hours at 135° C., without any appreciable loss of the morphine.

But the presence of the products of the decomposition of the urea prove about as objectionable as that of the urea itself. Since urea is freely soluble in water, whilst morphine is only sparingly soluble, it might be inferred that those substances could thus be readily separated.

This is true in regard to pure mixtures, and also when the morphine has assumed the crystalline state; but when present in only minute quantity, the alkaloid seems to be so closely adherent with the urea and coloring matter that these substances are largely dissolved together. Experiments made in regard to the adaptability of isobutyl alcohol for the extraction of morphine from complex mixtures, especially from the urine, show that on treating excess of finely powdered morphine with the hot alcohol and allowing the mixture to stand sixteen hours, it was found that 1 part of morphine was held in solution by 110 parts by weight of the alcohol. Under the same conditions, 1 part of urea was retained in solution by 49.8 parts by weight of the alcohol. It would thus appear that morphine, while rather freely soluble in isobutyl alcohol, is slightly less soluble in this liquid than in amyl alcohol; whereas urea, on the other hand, is somewhat more freely soluble in isobutyl alcohol than in amyl alcohol.—After *Chem. and Drug.*

IODO-NAPHTHOL.

M. Braille, describes a compound of iodine with *b*-naphthol (*Union Phar.*) It is stated to be prepared by mixing an aqueous solution of 24 grams of iodine and 27 grams of potassium iodide with an aqueous solution of 110 grams of *b*-naphthol and 40 grams of caustic soda, and adding to the mixture gradually a solution of sodium hypochlorite corresponding to ten times its volume of chlorine. The iodo-naphthol is precipitated as a greenish-yellow powder, which is collected and washed several times with water and dried in the dark. When exposed to the light, the greenish color becomes intensified rapidly. The product is said to be odorless and tasteless, insoluble in water, almost insoluble in alcohol and acetic acid, partially insoluble in ether and very soluble in chloroform.

ALTERATIVE.

Dr. Fyke, in the *Courier of Medecine* claims the following to be an excellent prescription in all wasting diseases:

℞

Hydrarg. bichlor.	gm. i,
Lib. arsen. chlor.	♏ ii.
Tr. ferri. chlor.,	
Acidi hydrochl. dil.	♎♎ ʒ ss.
Syr. limonis	ʒ ii.
Aquæ dest.	q. s. ad ʒ vi

M. To adults a teaspoonful every four hours.

NEWS AND MISCELLANY.

A. C. E.

In the famous old a. c. e. mixture,
Both ether and chloroform stay;
But neither of these is a fixture,
As a safe anæsthetic to-day.
Some countries are partial to neither,
Tho' England gives chloroform sway;
"How happy could I be with *ether*,
Were t'other dear charmer way."

L. Lewis.

THE PHYSICIAN.

The following is the translation of an epigram written by Cordus in the sixteenth century:

The Physician like an angel seems
When he in the sick room brightly beams,
And like unto a god is he
When he's removed the malady.
But in a different light we view
The doctor when his bill is due;
Our alter'd eyes we at him level
As though he were the very devil.

Dr. Carl, in Med. Brief.

PROPRIETARY REMEDIES.

Thirty years ago Great Britain derived from patent medicines a revenue of $210,000. The same tax now yields $98,500,000 a year. All this increase is at the expense of the gulled public; the honest apothecary and the doctor being large losers.

INTERNATIONAL GYNÆCOLOGICAL AND OBSTETRICAL CONGRESS.

Dr. Jacobs, General Secretary to the Congrès Périodique International de Gynécologie et d'Obstétrique, which will hold its first meeting at Brussels in September, announces that the following subjects have been chosen for special discussion: (1) Pelvic Suppurations, to be opened by M. Segond, of Paris; (2) Extrauterine Pregnancy, by Dr. A. Martin, of Berlin; (3) Placenta Prævia, by Dr. Berry Hart, of Edinburgh.

INSANITY AN EXCUSE FOR ADULTERY.

A curious medico-legal point was raised in a suit tried a few days since in the Divorce Court. The action was brought by the husband, and the adultery of the respondent was admitted, she having herself taken the trouble to communicate the fact by letter. There was, however, evidence to show that she had left the conjugal domicile under the influence of delusions, and her insanity was virtually established. It was therefore urged on her behalf that under these circumstances she was not legally responsible for her actions. The judges held, however, that though insane she had retained sufficient mental capacity to be aware of the nature and consequences of her actions, and, on this ground the divorce was accorded. So far so good, but from a medical point of view, it were much to be desired that mental alienation *per se* should be admitted as a reason for divorce. Even if the demented wife should subsequently recover her reason, it is eminently undesirable that she should regain the right to reproduce and thus to perpetuate the morbid strain. Our divorce laws were based on social and moral considerations, the still small' voice of the physiologist not having made itself heard. Pathological, like criminal proclivities entailing the loss of the civil status, ought to be recognized as unfitting their possessor for the conjugal relationship. It is fully as important to the community to prevent the multiplication of the insane or the mentally unstable as to check the manufacture of juvenile criminals. Unfortunately, the authorities who show the greatest solicitude to preserve the breed of horses from contamination display a very manifest reluctance to protect the human race from similar contamination. Perhaps, with the march of intellect, public opinion may by-and-by be educated up to the point of agitating for the enforcement of physiological laws.—*Med. Press.*

DURATION OF LIFE OF VARIOUS ANIMALS.

The *Scientific American* give the following estimates of the duration of the life of various animals: Elephants, 100 years and upward, rhinoceros, 20; camel, 100; lion, 25 to 70; tigers, leopards, jaguars, and hyenas, (in confinement) about 25; beaver, 50; deer, 20; wolf, 20; fox, 14 to 16; llamas, 15; chamois, 25; monkeys and baboons, 16 to 18; hare, 8; squirrel, 7; rabbit, 7; swine, 25; stag, under 50; horse, 30; ass, 30; sheep, under 10; cow, 20; ox, 30; swans, parrots, and ravens, 200; eagle, 100; geese, 80; hens and pigeons, 10 to 16; hawk, 30 to 40; crane, 24; blackbird, 10 to 12; peacock, 20; pelican, 40 to 50; thrush, 8 to 10; wren, 2 to 8; nightingale, 15; blackcap, 15; linnet, 14 to 23; goldfinch, 20 to 14; redbreast, 10 to 12; skylark, 10 to 30; titlark, 5 to 6; chaffinch, 20 to 24; starling, 10 to 12; carp, 70 to 150; pike, 30 to 40: salmon, 16; codfish, 14 to 17; eel, 10; crocodile, 100; tortoise, 100 to 200; whale, estimated, 1,000; queen bees live 4 years; drones, 4 months; worker bees, 6 months.